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NOVEMBER, 1922

VOL. XVI, No. 11

PRINCIPAL ILLUSTRATIONS

ARTICLES AND DEPARTMENTS

Wollensak World

PUBLISHED BY THE WOLLENSAK OPTICAL COMPANY ROCHESTER, NEW YORK

DEVOTED TO LENS AND SHUTTER INFORMATION

VOL. II NOVEMBER, 1922 No. 11

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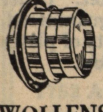

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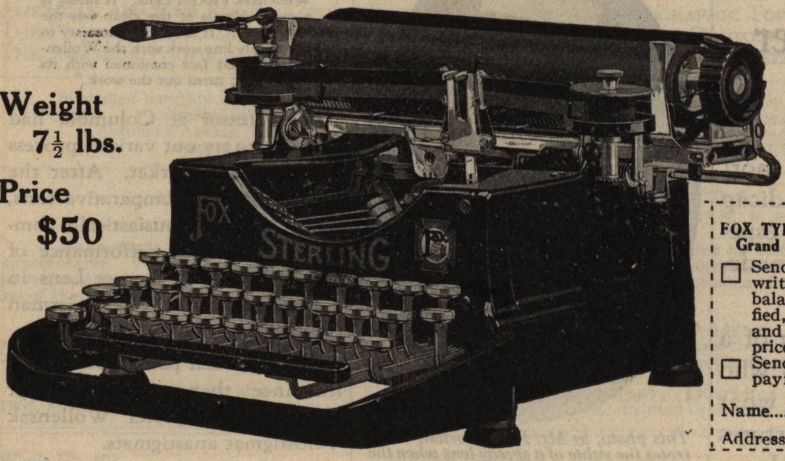

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AMERICAN PHOTOGRAPHY

VOL. XVI BOSTON, MASS., NOVEMBER, 1922 No. 11

THE IRON SALTS. I.

E. J. WALL, F. C. S., F. R. P. S.

NEXT to the silver salts the organic salts of iron are those most used for sensitive surfaces, though many of the inorganic compounds, which are in themselves relatively stable to light, become markedly light-sensitive in the presence of organic matter. Thus ferric chloride is practically stable, but in the presence of such compounds as alcohol and gum, or gelatine, it is rapidly reduced to the ferrous state. Eder has given the following table of the relative sensitivity of the iron salts:

Ferric chloride plus oxalic acid	100
Ferric oxalate	89
Ammonio-ferric oxalate	80
Potassium ferric oxalate	78
Ferric tartrate	80
Ammonio-ferric tartrate	80
Ammonio-ferric citrate	15
Ferric chloride plus citric acid	19
Ferric chloride plus tartaric acid	25

In the above table the ammonium ferric citrate referred to is the old brownish-red salt, but there is also a green salt, which gives about eight times the sensitiveness, and this should always be used.

There are several printing processes based on the light-sensitiveness of the iron salts, though many of them are but little used, and others completely obsolete. A brief summary of the processes will be given.

CYANOTYPE OR BLUE-PRINT PROCESS. — Probably this is the most widely used of all the iron printing processes, for the production of "blue prints," so much used for architects' and other plans. The prints show white lines on a blue ground from a drawing, or obviously a blue positive from an ordinary negative.

The sensitive salt used is the ammonio-citrate of iron, which is reduced from the ferric to the ferrous state by the action of light. When developed in water, the potassium ferricyanide, which is also present in the coating, immediately reacts with the ferrous salt, giving the familiar Berlin blue image.

PELLET'S PROCESS. — This gives blue lines on a white ground from a drawing and would, therefore, give a white image on a blue ground from a negative. Here the sensi-

tive mixture is ferric chloride and tartaric acid with gum arabic, and the action of light is to produce the ferrous salt, which reacts with potassium ferrocyanide, which is used as a developer, to give a white image, whereas the ferric salts unreduced by the light again form insoluble Berlin blue. We have, therefore, practically the reverse action to that in the cyanotype, but in both cases the image is formed by the different action of the ferric or ferrous salts with ferricyanide or ferrocyanide.

PLATINOTYPE. — In this process the light-sensitive salt is ferric oxalate, again reduced to the ferrous state, and this latter dissolves in the alkaline oxalates and other salts used as a developer, and reduces the platinum salt, which is in itself not affected by light, to the metallic state. Metallic platinum is the most resistant of all metals to chemical action, free chlorine being about the only thing that attacks it, therefore, a platinotype is the most permanent of all photographic prints, even more so than the paper on which it is produced.

SEPIATYPE. — Here again, we have the light-sensitiveness of the ferric citrate, in the presence of silver nitrate, and the latter is reduced by the ferrous salt to the metallic state. Obviously this process does not do away with the use of hypo.

KALLITYPE. — Ferric oxalate is the sensitive salt, the image being formed of metallic silver, which is reduced by the ferrous salt which is dissolved by the developer. There is obviously considerable similarity to the course of reactions of platinotype.

Of the dead and gone processes we have chrysotype, one of the very earliest of all printing processes, in which ferric citrate was used as the sensitive salt, the image being obtained in metallic gold. Obernetter's process, also called cuprotype, is based on the light-sensitiveness of a mixture of ferric and cupric chlorides, cuprous chloride being formed, and on treatment with potassium sulphocyanide and then ferricyanide, reddish-brown cuprous ferrocyanide is formed. It will be seen that there are other processes also.

To those who want to use the ferric salts as sensitive agents there is one fundamental advice which should be most carefully noted, and that is that it is very rarely that a ferric salt, such as the citrate or oxalate, is fit for use as purchased. It has been stated that the organic iron salts are sensitive to light and it is unusual for the stock in an ordinary drug store to be protected from light, so one frequently meets with trouble from this source. Another point is that all ferric salts are extremely liable to be reduced to the ferrous state by the absorption of carbon dioxide, or carbonic acid, from the air. This is well seen in the case of ferric oxalate solution kept in a half-filled bottle, when the basic salt can be seen to form as a pale yellow crust on the surface of the liquid, and will gradually fall to the bottom of the bottle, forming a deposit of the characteristically colored ferrous oxalate. That a solution of ferric oxalate, even in a completely filled bottle, is light-sensitive, is proved by the fact that the side of the bottle turned to the light becomes in time encrusted with a deposit of the orange ferrous salt, and this although distilled water may be used.

Although it is a little trouble, it is well worth while, if one wants to dabble in kallitype or platinum printing, to prepare the ferric oxalate oneself. One can then be quite sure that it is in good condition and suitable for the work.

The simplest method is that proposed by von Hübl, which has as its raw material ammonia iron alum. This, although called an alum, does not contain aluminum, but is a double sulphate of ammonia and ferric iron and has the formula $(NH_4)_2SO_4$, $Fe_2(SO_4)_3$, $24\ H_2O$. It occurs in fine amethyst colored crystals, usually quite large, and it should be free from any adherent yellow powder.

To make the ferric oxalate, weigh out 52 g (400 gr.) of the iron alum and add 52 ccm (400 minims) of distilled water, and heat till dissolved. A slightly orange-colored solution

PORTRAIT
MINYA DÜHRKOOP-DIEZ

is obtained, which should be allowed to cool slightly; then add 20 ccm (154 minims) of strong ammonia, and stir well. One may now proceed in one of two ways. The original method was to place the mixture, which is now a thick reddish liquid, due to the precipitation of ferric hydroxide, in a tall cylindrical graduate, one capable of holding 100 ccm, fill up with distilled water, shake well and allow to settle and then syphon off the supernatant liquid, and repeat this operation till the washing water no longer gives a precipitate with barium chloride, or no longer smells of ammonia. Unfortunately this is a very tedious job, as it may take two days or more.

If one has a Buchner filter and a suction filter flask that can be fitted to a water supply with an aspirator, the washing may be completed in about a couple of hours. But there are few amateurs who have these simple appliances and therefore the following simplification is suggested. Filter in the usual way through filter paper, using as small a circle of paper as one can; about 4 ins. should be quite large enough, with a little care. Allow the filter to run as dry as possible and then pass more distilled water through, allowing the precipitate to become so dry that the wash water no longer drips from the funnel. As soon as the washing is complete all further work must be carried on by artificial light.

If the original plan is preferred, then the precipitate and water, in which it is suspended, must not exceed in bulk 85 ccm (1440 minims); now the reason for using the tall graduate will be seen, as one can easily read off the bulk. To this should be added 21.5 g (332 gr.) of pure oxalic acid, and the mixture stirred till a perfectly bright green solution is obtained, which should be filtered and the bulk made up to 100 ccm (3 oz., 249 minims).

In the modified method the above quantity of oxalic acid is weighed out and dissolved by gently warming in 60 ccm (2 oz.) of distilled water and then poured on to the ferric hydroxide on the filter, and the red precipitate will begin to dissolve, the liquid turn green and run through the paper quite bright and clear. If there are any traces of red peroxide left on the paper the liquid should be passed through again, and finally enough distilled water should be passed through to make the total bulk as before 100 ccm.

The result will be a 20 per cent solution of ferric oxalate, with an excess of 1.2 per cent of oxalic acid; this is the normal ferric oxalate solution for the platinum process and it may be used for all other printing processes in which ferric oxalate is required.

With regard to the ammonio-ferric citrate, one should hardly attempt to make this, but in all cases the green salt should be obtained from a reliable house. The old red salt is a basic double salt of ferric and ammonium citrates with ferric hydroxide. The green salt is a mixture of neutral ammonium ferric citrate with acid ferric ammonium citrate and ferric citrate.

This is specially used for the cyanotype process; but before dealing with this it is advisable to say a few words about its companion, the potassium ferricyanide. Nothing but the pure salt that sold as a "reagent," should be used. It should be in perfectly pure ruby-red clear crystals, without any adherent yellow powder. Before use the crystals should always be washed to free them from any possible contamination of the ferrocyanide, which is the yellow powder, and which will prevent one from obtaining pure whites in the prints. It is not advisable to keep this salt in a stock solution, only enough being weighed out as required for immediate consumption. But as the crystals have to be washed, and thus lose a little, a little extra should be allowed for this in weighing out; but very little, not more than 1 per cent.

To wash the crystals they should be dropped into a graduate filled with distilled water, for instance if 1000 ccm, or 16 oz., of solution are required, then half the quantity of water may be used. As soon as the crystals have reached the bottom of the graduate they will be sufficiently washed and the water should be poured off.

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A test for freedom from the ferrocyanide is to add a drop of dilute ferric chloride solution, or other ferric salt, when the presence of ferrocyanide is shown by a blue tinge. Actually the best way is to put a drop or two of the ferricyanide solution on a sheet of opal glass or other white surface, and then with a glass rod put at the side a drop of the ferric solution, and then mix; this shows the blue tinge very readily. Ordinary paper should not be used for the white surface, but filter paper may be, and if the drop of ferric solution is placed in the center of the wet patch formed by the ferricyanide, the blue tinge is very apparent.

The best ratio for the two salts is as follows (Valenta, *Jahrbuch*, 1898, **12**, 448):

A.	Green citrate	125 g	960 gr.
	Water	500 ccm	8 oz.
B.	Potassium ferricyanide	45 g	346 gr.
	Water	500 ccm	8 oz.

These solutions are mixed just before use. Although the quantities are given for the usual bulk of 1000 ccm (16 oz.) it is not advisable to mix such large quantities; only as much should be mixed as will be used at one time. For, althougn the mixed solution will keep for some time in a well-stoppered bottle, there is always danger of oxidation, and the paper will not then give pure whites.

The paper used for this process may be of any kind; but, naturally, fairly smooth, well-sized papers are to be preferred. Wood-pulp papers are always apt to give dark blue spots and streaks, but some of the better class of these can be used. A very simple test for a paper is that given by Valenta (*Chem. Ztg. Rep.*, 1916, 104): dissolve ferric ammonium citrate 1 g (15½ gr.) in 40 ccm (676 minims) water and add potassium ferricyanide 0.6 g (9 gr.), then boil a strip of paper in the mixture for about 2 seconds; no blue tinge should be formed in the paper.

It has been suggested, in order to keep the image on the surface of the paper, that either the paper should be resized with gelatine, or dextrine or gum should be added to the sensitizer. There is, of course, no fundamental objection to this; but as the whole purpose of the cyanotype paper is to furnish a rough working plan, this is an unnecessary refinement. One rarely wants to print from an ordinary negative in the vivid blue of cyanotype, for the color is not suitable for ordinary views, except possibly ice and glacier scenes, and these can be much more effectively dealt with by the cyanotype toning of a bromide or development print.

To coat the paper properly requires a little knack and some care. The best way is to use a drawing board as a support during coating. Two glass-headed pins should be used to pin the two top corners of the paper to the board, which should be supported on a slant, by a block of wood or a couple of fairly thick books.

It is very important, however, that the sensitizer should not come into contact with the metal of the pins, and to prevent this, guards should be used. These may be conveniently made from a card; an ordinary visiting card cut in two is about the most convenient to use. This gives two pieces, about 1¾ x 2 inches, and if the opposite edges are each turned up for half an inch, the pin can be driven through the middle of the flat piece and there is little danger of the solution reaching the metal.

Two brushes are required, and these should be preferably of hog's bristles, about 1 to 1¼ inches in length. A flat and a round one will be required; the flat one need not be more than 2 inches wide and the round one about 1½ inches in diameter. *They must not be bound with metal.* This is very important.

The paper should be pinned to the board and the sensitizing solution preferably

GROUP
MINYA DÜHRKOOP-DIEZ

poured out into a household saucer. The flat brush should be dipped into the solution, as far as it will go without getting the solution into the binding of the brush. Then with one even sweep the brush should be passed over the surface of the paper across from left to right at the top of the sheet, the brush again dipped in the solution and another sweep made just below the first one, and this continued till the whole of the sheet is covered with the solution.

There is one point that is so obvious that it may seem puerile to mention it, but I have seen this neglected, because, as the man said, "I didn't think." The vessel containing the sensitizer should be placed at the left hand, quite close to the board, so that it is not necessary to carry the brush, saturated with liquid, over the paper, thus giving it every chance to drop some of its contents on the paper. If this happens a darker spot is almost certain to appear later in printing. If the saucer is placed at the side, the brush may be charged with the solution and at once transferred to the paper.

The coating of the paper should be done as rapidly as possible. As long as patches are not actually missed unevenness of coating is of no moment, if one works rapidly.

As soon as the whole surface of the paper has been gone over it will appear here and there with wet streaks, and with others partially dry. Then the round brush should be brought into play and the whole surface gone over in rapid circular strokes, each overlapping till the coating appears evened out and no longer shows unequal wet streaks.

If during the sensitizing the paper should cockle, and it always will, through expansion, one of the pins should be taken out and the paper restretched.

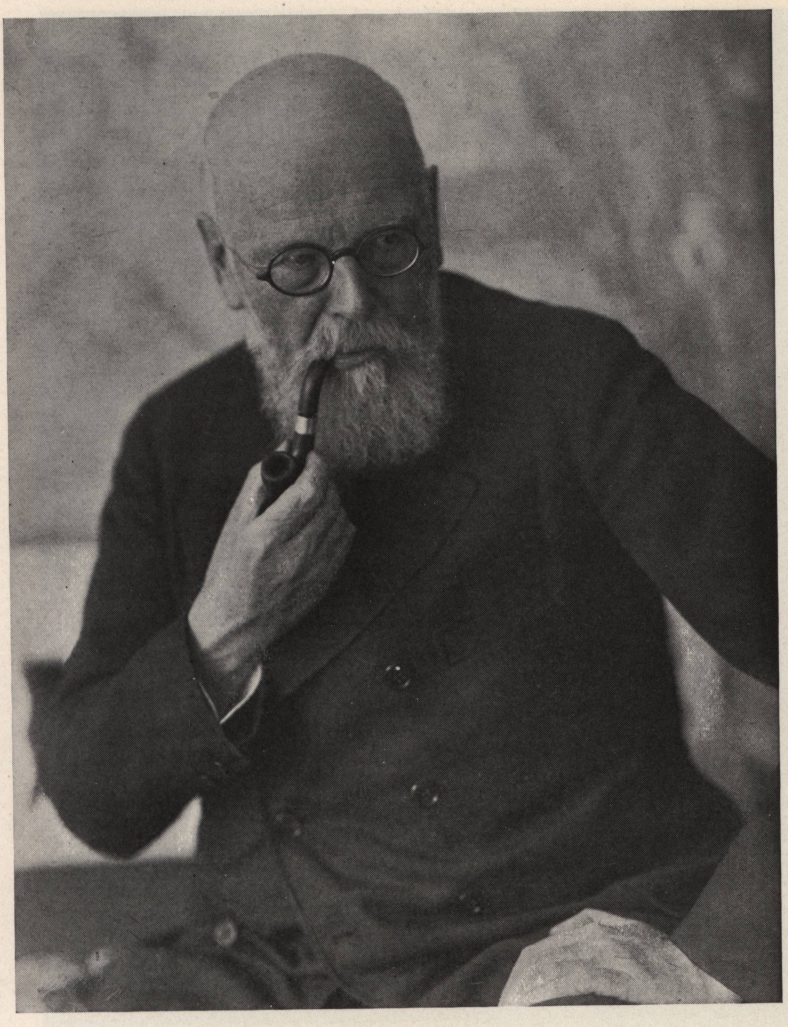
The most important part of the sensitizing is the drying, and here many fail, and then blame the chemicals or paper. If the paper is allowed to dry spontaneously by merely hanging it up, perfect results cannot be looked for. The paper should be practically dry in five minutes.

Commercially the paper is passed over hot rolls and a current of hot air driven over it; but for small work the best thing to use is one of the electric hot-air dryers, used by hairdressers and bootblacks. This should be held about ten inches from the paper, which may be left on the board, and if the hot air be directed to the lower edge of the paper and moved, if the paper is any size, across and up and down, the paper will be dry in five minutes, but the heat should be continued for at least ten. Paper thus prepared, if thus dried, will keep in the dark for a fortnight.

There are one or two points that must still be dealt with. Sensitizing must be effected by artificial light and not too brilliant a light at that. Before the brushes are taken into use they should be well washed, for although they are new, this does not necessarily mean that they are chemically clean. The best way to clean them is to wet them with warm water and rub them on a piece of soap, or in soft soap for preference, then work them into good lather in the palm of the hand, then wash out in clean warm water. Repeat this operation at least three times and finally use three or four lots of hot water to rinse them. Hang them up by the handle to dry. If the handle has not a hole in it, an ordinary wooden clip may be used, and this hung over a line. This prevents the water from soaking into the binding and prolongs the life of the brush.

After use rinse the brush two or three times in water acidulated with acetic acid, or citric, about 1 per cent, then immerse in fresh acid water for at least five minutes, taking care to keep the binding out of the water, then wash in distilled water and hang up to dry. A dirty brush, or one charged with remnants of a previous sensitizer, always leaves its mark in the form of dark streaks visible on the finished print.

Various additions have been suggested to the sensitizer, for instance, 0.5 per cent of



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oxalic acid; this would mean 50 g or 380 gr. added to the above quantities of sensitizer. This gives even greater rapidity of printing; but naturally the paper will not keep so long, and in my experience it is not worth while. The addition of 0.05 per cent of potassium bichromate gives a better keeping paper and gives purer whites, and also slows the paper a little.

The exposure varies naturally according to the thickness of the tracing cloth or paper, and if a non-reversed print is required from a line drawing, it is obvious that the back of the drawing must be in contact with the sensitive surface. Printing in direct sunlight is advisable and the insolation should be continued till the lines of the drawing appear of a somewhat dirty yellow on a distinctly bluish-green ground. It is better to give a fuller rather than a short exposure, as the color of the ground is then much deeper.

Development is effected by bodily immersing the paper in water, preferably face down, when the ground instantly turns a deep blue and the lines show up white. As soon as the lines are clear the print should be transferred to clean water, and washed either with

PORTRAIT — MINYA DÜHRKOOP-DIEZ

a spray or in running water for at least ten minutes and then hung up to dry. It is a good plan, however, to place the print on a board or glass and blot off the surface moisture with blotting paper or a lintless cloth. This prevents spots from adherent water drops.

Many dodges have been suggested for toning blue prints, such as treating with ammonia and then acid, or with catechu, or ammonia followed by dyes. These are best left alone. There are only two tricks worth trying. One is developing the prints on a 0.2 per cent solution of potassium ferricyanide instead of water; this gives more stable and more contrasty prints. The other is immersion of the print in a 1.25 per cent solution of ammonia until the blue image disappears; then well wash and float on a 2 per cent solution of tannin. A blackish-brown color is thus obtained. Or the print may be washed in distilled water, and by yellow light bleached by immersion in a 2 per cent solution of silver nitrate, then washed in distilled water, subjected to the fumes of ammonia and exposed to white light and developed with ferrous oxalate. A black image is thus obtained. In special cases these may be used, but better results can be obtained by other

processes to be described later.

Finally it must be recognized that the Berlin or Prussian blue is not stable to light, but fades out and can become quite pale. Such prints can however, be restored, if necessary, by exposing them to the air in a damp place, and if necessary to hasten this the print may be first laid between two damp sheets of blotting paper and then hung up.

It may be necessary to make corrections on a blue print, or to add lettering or instructions. The best thing for this is:

Gum arabic	10 g	77 gr.
Potassium oxalate, neutral	50 g	384 gr.
Water	1000 ccm	16 oz.

A fine drawing pen should be used; this solution dissolves the blue image and a wash completes the process.

Other iron processes will be dealt with in later articles.

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C. F. STILES

PART II

S A RULE copying conditions can be standardized. Incandescent bulbs are universally available and it is but a slight task to improvise a copying board with lights attached, giving uniform illumination from both sides. A very convenient kind of bulb is the "tubular" or "bunghole" type, with long filaments. These are used in showcase illumination. The light being constant, the variables are exposure and development. By systematic working, these can be kept within close limits.

The camera bellows must, of course, be ample for extensions as great as two focal lengths, if copies the same size as the original are to be made. The granular nature of the surface copied will disappear when the light sources are equal in strength, and exposure is therefore dependent on the color and distance of the original and the sensitiveness of the plates used.

The stop values really change with each distance, but we will judge the illumination of the image on the ground glass, and if the stop is left alone, the exposure can be made to depend on the camera extension. It is unnecessary to make a wild guess at exposure, as one plate exposed in sections by drawing out the slide an inch or two at a time will give a basis to work from at all times. If we know the proper exposure for same-size images, and make a copy needing only four-fifths of this extension, the exposure will be sixteen twenty-fifths of the standard. The same rule works on enlarged copies. If the bellows length doubles, then four times as much exposure is needed, i. e. the square of two.

In copying a photograph, you can focus with convenience by using a thin printed sheet, such as an old calendar leaf, laid over the print. This gives positive sharp lines to focus on. You can make no sharper image than the original print. A lot of time may be saved by making a test plate of some design or printed matter, from which you can determine the largest practical stop your lens permits. The stop selected must take care of the unavoidable and slight curvature of plates or ground glasses used, and must be smaller if

PROCESSION AU VILLAGE — STEFANO BRICARELLI

First Prize, September Senior Competition

the registration of the apparatus is imperfect. The buckling of unmounted photographs is sometimes remedied by ironing or by photographing under glass, if care is taken to avoid reflections.

There is a tendency to stop down, because of the assumption that sharpness will thus increase proportionally. Beyond moderate limits, there is not a great advantage, especially with anastigmats. Of course, the increased depth takes care of errors of registration in apparatus. It is much better to adjust such errors, so that you can use the advantages of critical focusing at large apertures. Larger apertures tend to more brilliancy in negatives. The need of accuracy in apparatus is most intensified with fine line subjects or copies to scale, where the lens aberrations may figure. With abnormal lights there may be some change of focus due to the composition of the light rays being different from daylight, but this is not likely to happen, especially when filters and color sensitive plate are used. What is more probable is a change in image size, due to zonal aberrations left uncorrected. The plane of sharpest focus shifts on stopping down, making some refocusing necessary if the image size must also be maintained.

Many of the troubles in copying disappear when panchromatic plates are used. Even if a photograph is entirely in tones of the same color, it may yet vary in its action under the light. The white parts may really be yellow and photograph dark, which reduces contrast. The use of filters and their proper selection is a whole subject by itself. Only rarely does a subject come up that cannot be greatly improved by their intelligent application. I do not mean to imply that copying cannot be done with ordinary plates.

When only such are available, the slower have advantages in latitude for errors of exposure and development. I have seen very good copies made with fast plates, but as a rule the slower emulsions work better and the ordinary man wastes less material.

Development of panchromatic plates by the tank method gets away from the danger of fogging plates by unsafe lights and reduces marks from handling the film unnecessarily, but often only one plate is handled at a time and tray methods are more convenient. When exposure is fairly standardized, time formulas in developing give uniform results. The aversion to panchromatic plates by some workers seems to be founded on prejudice rather than on experience.

Black and white copying differs from the reproduction of continuous tone subjects. We have instead fine image lines on the plate, adjacent to bright patches of considerable area. With great reduction, the actual width of the fine lines is very small. The white patches on the copy reflect much light and, as the camera is extended, the light-pocketing action of the bellows folds is less. Such reflections tend to veil over lines, and in addition there is a spreading sidewise of the light action in the film, a sort of halation known as "irradiation." Thus effect and vibration troubles have more chance to develop with longer exposures. The images produced by highly corrected lenses are always blacker than those from ordinary types, as proven by the projected images in lens tests. There are no uncorrected rays falling on the wrong spots, one of the reasons why an anastigmat can dig into shadows and show up faint detail and low gradations.

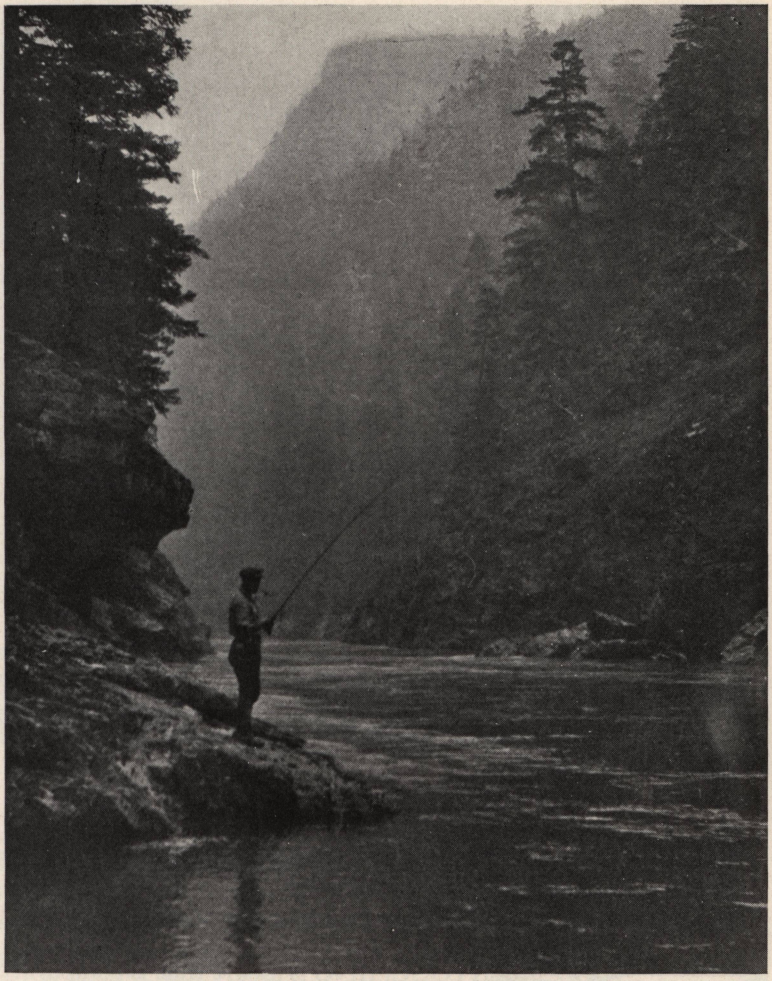
When black and white work is frequent, it is well to verify the registration of the holder and focusing screen, and use only tested holders. We often find in photographers' outfits holders not made by the camera manufacturer. Errors ordinarily of no importance cut some figure in this accurate work. The bother of adjusting only comes once, and is very simple in practice. You need a truly flat stick to rest on the sides of the plate-holder with a wood screw in centre. This can be adjusted so that it touches a dummy plate placed in the various holders, and also laid across the ground glass frame in a similar way.

Sometimes broken ground glasses are replaced facing the wrong way, which at once destroys the register. On view cameras, the glass side faces out universally, but on other types the position varies, hence this warning. Focusing screens and sensitive plates are not absolutely flat. In practice, the latter are concave on the emulsion side, which will force some stopping down for precision work. Select your ground glass with care.

To focus precisely, a very fine ground glass or substitute is needed. They are harder to use than ordinary types and require magnifiers. Most so-called focusing magnifiers, reading glasses, etc., are of no value in fine work. The proper types are those of tube form, where lenses can be locked at a definite point, after focusing sharply on a transparent glass with some surface mark. Such magnifiers when applied to ground glass show when the image comes to focus, without adding errors of the eye produced by hand-held glasses at varying distances.

For more transparency than ordinary ground glass will give, special iodide screens can be used. These are made by fogging a slow plate; after fixing, the silver is bleached by potassium iodide solution of iodine. Ammonia water will remove any yellow stain, and celluloid varnish will protect the surface. They grow yellow in time but this is not objectionable.

Extreme accuracy in focusing can be reached by parallax methods. A ground glass or iodide screen is made, with a clear glass patch in centre. On this a reference mark or scratch is made, or a bit of tin foil with a straight edge cut by a safety razor blade is pasted on the spot. The image is focused as usual, but changes are detected with the focusing



WHERE THE HILLS ARE HIGH AND THE TROUT ARE LARGE

J. B. GALE

Second Prize, September Junior Competition

glass by the amount the image seems to move in relation to the reference mark, when the eye position shifts slightly from side to side. When no movement can be detected, the image and screen are in the same plane. This method is quite independent of errors of eyesight. It is of course obvious that the axis of the lens must be truly perpendicular both to the copy and to the ground glass in all accurate work.

With correct exposure, development of slow plates will take care of itself. The point to avoid is blocking up of the lines. These should stay perfectly transparent while the black parts develop to opacity. If the lines veil over, from prolonged exposure, developing or other causes, later intensification is more complicated. When the error is towards underexposure, the blacks can be built up by the density-giving intensifiers. An overtimed plate must be cleared in the lines before intensification can be attempted. The proper printing paper is the contrasty, and photographers who are familiar with the various printing materials can often correct slight errors without any intensification at all.

A half-tone copy may be treated differently. Here we may capitalize a little over-exposure. This fills up the clear dot spaces and makes the negative approach a continuous tone effect. Subjects in warm-tone inks on slightly tinted paper often give trouble without filters. This is particularly true of duotone inks, where the space between the dots is colored by a dye that spreads sidewise from the ink dots. This becomes a filter problem. Colored originals demand filters, unless the customer is quite devoid of sense of color values.

Pencil drawings usually give trouble, as the lines are not solid and continuous like ink marks. They can be vastly improved by using a fine ground-glass, with the surface in contact with the paper.

Paintings are filter subjects, but in addition to this, the lighting problem may need modification. The surface is sometimes made up of brush marks, which control the shadow effects. These are put on by the artist with reference to the direction of lighting. By inverting paintings for photography, these conditions may change. It is safer to copy them right side up so that the light can come in slight excess from the direction indicated by the artist.

Certain subjects can be copied much better when some ingenuity is used at the outset. Tracings may be backed with a white cardboard. On printed matter with printing on the back, an improvement comes by backing up with black. A wet print may be squeegeed on glass. Old daguerreotypes have been copied in a transparent water bath to get rid of the reflection of surface scratches. The renovation of subjects before copying is sometimes a delicate matter, as regards responsibility. Art gum will remove many things, but the bleaching of old engravings or documents, or the cleaning of delicate daguerreotype surfaces, may lead to embarrassing situations.

COMMONSENSE RETOUCHING

J. DE WITT KREPS

RETOUCHING is an art that is comparatively easy of accomplishment. Not how to apply the lead, but where to apply it is the essential thing to know, and, for that very reason, all teaching can be only very general in scope.

The ideal retouching pencil must contain a uniform, high-grade lead of constant quality. It should be obtainable in many degrees of hardness, at a moderate price and in convenient, non-fatiguing holders. To begin with, about four pencils will be all that are needed — hard, medium hard, medium soft and soft. Other leads, probably, will accumulate as time goes on and experience ripens. Which grade is the best to use in any particular instance can be ascertained only through experience. The only information that will be neither confusing nor liable to misuse is this: the lead that blends with the surrounding parts of the negative is the one to be selected, and the heavier the deposit on the negative, the softer will be the lead required to match it in density.

An etching knife is a necessary part of the retoucher's equipment. This may be a shaped and sharpened darning needle, an etching pen, used with an ordinary pen-holder

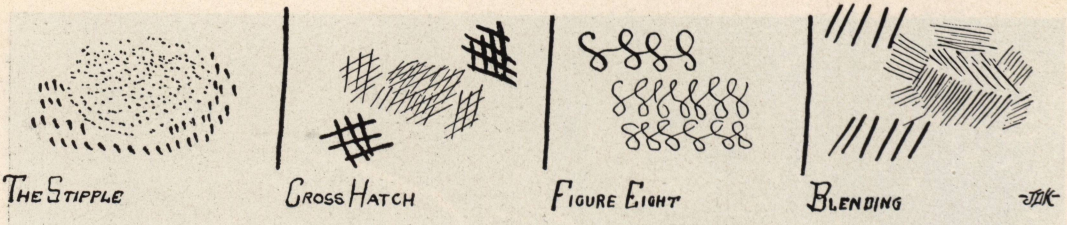
TIMIDITY — JUVENTINO OCAMPO

Third Prize, September Senior Competition

as a handle, a "store" knife, or an ordinary well sharpened penknife. A knife is very useful for removing unnecessary highlights, such as, for instance, lights reflected by buttons, jewelry or eyeglasses. For reducing larger areas some one of the many forms of abrading implements, such as the "hi-lite" reducer, made of fine strands of spun glass, is better than a knife and is easier to manipulate. The art of using a knife is harder to master than the use of the pencil, yet it is an accomplishment that should be learned, as it is of inestimable value. Considerable practice is needed before the user becomes really expert. The knife should be held so that only the surface of the negative is touched and the emulsion should be shaved very, very lightly. The knife must not scrape or drag, or the work will be uneven. A little careful practice on an old negative will be necessary to get the required knack. Often a box of candy or a good cigar coupled with an agreeable and respectful disposition will be an "open sesame" to a profitable acquaintance with a "real live retoucher."

India ink and spotting colors are needed to clean up pinholes and deep scratches. They are usually applied to the negative with a fine "spotting" brush. If a pen point is used as the means of application great care must be used to avoid damaging the fragile emulsion beyond repair.

"Opaque" is very useful for "blocking out" objectionable backgrounds. Often a subject will stand out with a new value and more convincingly if the print is made with a complete absence of background. This effect is easily secured by opaquing the negative up to the outer edge of the subject. The resulting print will show the subject against a



clear white surface. This often is necessary in commercial work, in pictures of such things as machinery, in which clear detail is required. It needs considerable patience and a steady hand.

Sometimes the opposite effect is desired; a black background instead of a white one. This effect can be obtained by etching away the background.

Some kind of retouching medium, popularly termed "dope," is needed. This is to be rubbed on to the negative. It dries quickly, leaving a fine, hard, grained surface that is ideal for the easy application of the retouching lead. This "dope," at the same time, protects the emulsion from abrasion and from the attacks of insects.

To secure sufficient transmitted light, it is necessary to support the negative in some manner, close to a window. Daylight, however, is not altogether satisfactory because it is constantly varying. The problem of proper illumination is best solved by using a retouching stand lighted by an electric bulb, the direct rays of which are softened and diffused by a piece of ground glass interposed between the negative and the light source. The ground glass should not be very close to the negative, or, if it is, it should be placed smooth side up, otherwise the grain may be too plainly visible and may interfere with the pencil work. If daylight is utilized as the means of lighting the negative, a north light should, if possible, be used, as it is far less variable than any other. The mirror supplied on the commercial retouching stands is not nearly as good a reflector as a large square of white cardboard. Consultation of a catalogue of photographic supplies will, undoubtedly, give those of a mechanical bent the inspiration to construct a stand that will be perfectly satisfactory. At this point a few words of warning are in order. When constructing any article to be used in connection with photography, one of the first considerations should be rigidity.

Of so-called "strokes" and "touches" there are a legion. Each retoucher has a favorite one. Four of the most common strokes are illustrated, each one being, necessarily, much exaggerated.

One of the first questions asked by the novice is: "What touch shall I use?" This is a hard question to answer. The average retoucher uses many "touches," and variations and combinations of them. The best one is the one that covers the area most quickly and with the smoothest effect. Every worker will have his own idea as to the amount of work a negative requires. As a general rule, much of the ordinary commercial work is over-retouched. It is very seldom that a patron desires a portrait so much smoothed out that there is no difference between the face and the neck, or "cleaned up" to such an extent that there are no separate tones in the numberless light-planes of the face, head and cheeks. The usual portrait can be divided, broadly, into four "zones," each being subdivided into further zones. The chief divisions are the face, the bust, the hands and draperies. The forehead is a surface that is made up of a number of light-planes. Wrinkles may be removed entirely or merely softened. Dark circles under the eyes and the "crow's feet "

THE CALM WATER — KOJI HOSHII

First Prize, September Junior Competition

at their corners should be eliminated. On the pupil of the eye there should, usually, be a triangular catchlight. If this is round or bead-shaped, it will impart a lifeless stare and give the portrait an unnatural appearance.

Eyebrows may be arched a little or may be softened, if they are too dark, by the careful application of the pencil.

A crooked nose will be straightened, as if by magic, when the shadows at the side are lightened or evened up. Flat nostrils can be given a better appearance if a slight highlight along the ridge is introduced by careful pencil work.

Hollow cheeks, or cheeks in which a healthy, red color has come out too dark in the photograph, may be filled out by retouching, but here caution must be exercised, for if it is overdone a "heavy" look is imparted to the subject.

Receding chins may be built up to order, by the simple expedient of lightening the upper part a little. A small shadow, just under the lower lip, produces the illusion of greater depth and roundness of the entire face.

A shadow should always be visible between the neck and the jaw. Squaring up the

latter and adding a highlight to the "point" will give the subject a forceful individuality.

In portraits of women, if the neck appears "bony," the artificial aid of retouching may be called into service.

Reams of paper and gallons of ink have been used up in giving instructions as to the manipulation of the subject's hands. Beautifully posed hands are rare. They are hard to manage, and to make them appear graceful and at the same time natural is one of the problems of portraiture. If the veins are over-emphasized, retouching will help. Sometimes it is necessary to reduce them a little in size by the careful use of the etching knife.

Draperies that are light in color may need a little local reduction. Any of the specially prepared reducing pastes, or a bit of cotton, moistened with alcohol, used as an eraser, will much improve the print. Sometimes the use of the knife is necessary to improve outlines.

As a general and very broad rule, it may be stated that in portraits of ladies under thirty, all lines and wrinkles may be removed. Over this age, the objectionable "footprints of time" may be eliminated and other character lines softened as much as may be considered necessary. Portraits of men usually require very little actual retouching, only a general "cleaning up" and softening of too aggressive shadows.

The best advice anyone can offer to the tyro, wandering down the grey road to success, is: Use sane judgment, practise constantly, and study, study, study.

Of course we must not forget that much of the retouching, once thought to be imperative, may be eliminated by skilful and intelligent lighting, by careful focusing and by the use of a suitable lens. Perhaps, in time, retouching as we know it, will become a "lost art." And that will be well, for it is sometimes of incalculable detriment to the truthful condition of any subject to which it is applied.

"Get it in the lighting" is the slogan of the new order of photographic portraiture.

PINHOLE EXPOSURES

BERTRAND H. WENTWORTH

THIS article is addressed to those who have experienced difficulties in determining the correct exposure in the use of pinholes, and to those who have hesitated to undertake their use from fear of such difficulties. I shall point out some of the principal sources of these troubles and explain my remedy for them. I shall try to express these purposes in simple terms, intelligible to all who understand the fundamental principles on which the *f* system of stops is based. Advanced workers will find some paragraphs which they can skim or skip to advantage. Such parts are included to make my argument complete and clear to those who are less conversant with such matters.

The advantages and disadvantages of the use of pinholes are too well known to need extended mention here. A set of five pinholes gives the worker choice of several degrees of diffusion of the image; all of these images are free from the ordinary aberrations of lenses; all of them have infinite depth of field, no matter what extension of bellows be used;

A TAPESTRY DESIGN
L. A. GOETZ
Pittsburgh Salon, 1922

and, from the last it follows, that, within the limits of the bellows capacity, any desired focal length may be used — any angle of view. The depth of field may be a disadvantage in many cases, since the emphasis of planes, obtainable with lenses, and in particular with soft-focus lenses, is not available.

This brief statement should enable anyone to decide whether a set of pinholes will be of service to him if he can find a way to secure certainty of results in their use. In nearly all of my problems, I prefer the use of a soft-focus lens, as against the pinholes, because of its power of differentiation of focus in the planes of the subject; and, of course, for its speed. I always carry a pinhole attachment, however, as a reserve power to be used when extremes of near and distant planes have to be dealt with, and when the most desirable angle of view is one not provided by any of my lenses.

The three outstanding disadvantages of pinholes are all due to the very small quantity of light which they are capable of passing, since the holes must needs be small to yield images of sufficient firmness. These disadvantages are: first, the long exposures necessary; second, the difficulty of viewing the image on the ground glass; and, third, the difficulty of determining the correct exposure.

The first of these disadvantages is an inherent difficulty which bars the use of pinholes in all cases where motion in the subject would defeat the operator. The second is not serious, because a hole large enough to produce a visible image may be provided to enable the operator to make sure that his picture is properly composed within the bounds of the plate; and no focusing is necessary — the image always being in focus, no matter what extension be used.

The difficulty of determining the exposure is the particular subject of this paper. In theory this difficulty should be less than with lenses. In practice much trouble is encountered. The writer has had his full share of troubles. He has overcome them once for all, he thinks; and he offers his solution here to all who are interested in the subject.

I promised, in the first paragraph, to point out the principal sources of these troubles, but I must needs speak only of my own. In my experience my troubles in reckoning exposures have been due primarily to my acceptance, on faith, of the conclusion of the man to whom I feel most indebted for his contributions to this subject, Dr. H. D'Arcy Power. I suppose that most of us who since the publication of his monograph (*Photo-Miniature* No. 70, 1905), have begun the use of pinholes, have similarly accepted his exposure formula.

Dr. Power's experiments were made with a series of holes, numbered respectively 1 to 5, and of the following diameters, in millimeters:

1.00 0.75 0.50 0.375 0.25

His exposure rule was stated as follows: "The number of the hole used, multiplied by the extension of the camera, equals the *f* value of the hole, providing the resulting exposure time is read in minutes in place of seconds, or in other words multiplied by sixty." In its inception, this rule was not derived from the mathematics of the problem, but from observations made in comparative exposures with lens and pinhole. These tests were made with one hole, and the findings were computed for the other holes, upon the premise of a supposed relationship in the light-passing power of his series. But Dr. Power's premises were false, for he had already fallen into an error in establishing the diameters of his holes. Of these diameters he says: "Starting with the millimeter hole as No. 1, the rest diminish in such a ratio that each passes half the light of the preceding. This is a great simplification, and makes transition from one hole to another an easy matter." The inaccuracy of the preceding statement is easily demonstrated by the application of

AN ADOBE IN CALIFORNIA — OSCAR MAURER

Pittsburgh Salon

the rule that the areas of circles are proportionate to the squares of their diameters The squares of Dr. Power's diameters are:

1.00 0.5625 0.2500 0.140625 0.0625

and these figures accurately show the relative light passing power of his holes. It may be noted that, while in no case does any hole pass just one half of the light passed by the preceding one, there is this accurate relationship: each hole passes one fourth of the light passed by the second one preceding. Beginning with a diameter of one millimeter, the required diameters of the holes, that each may pass one half of the light passed by the preceding hole are:

1.00 0.70711 0.50 0.35553 0.25

the squares of these diameters being

1.00 0.50 0.25 0.1250 0.0625

Now as to Dr. Power's formula for exposures, which I have quoted, it is not easy to put to the test of mathematics a formula based on hole diameters expressed in millimeters; on extensions expressed in inches; on the fortuitous relationship of the diameters to their arbitrary numbers; the result to be multiplied by a constant of sixty. It does not, however, seem to be necessary to work out this intricate problem, since I may quote Dr. Power: "For this formula to be both accurate and of easy application, it was necessary to

have the pinholes accurate in size, and the sizes standing in a simple mathematical relationship to each other." We have found that Dr. Power's holes do not bear the relationship to each other that he supposed, and we may conclude that his premises being wrong, his conclusions are inaccurate. Mr. Edward B. Mallory, in *The Photographic Journal of America*, June, 1920, after demonstrating the incorrectness of the relative values of Dr. Power's pinholes, undertook to apply mathematics to discover a series of constants which should be more accurate than Dr. Power's constants (hole numbers). Unfortunately Mr. Mallory did not set forth in detail the steps in his calculations; but we may still examine the soundness of his final formula for field use, which he states as follows: "After the exact diameters of pinholes have been determined, it will be apparent from the formula that a constant (*f* value at unit focal length) may be obtained by the portion of formula $\frac{l}{d \times 10}$, it then being necessary to simply multiply the focal length in each case by this constant to obtain the *f* value." It should be borne in mind here that by *f* value in this statement, Mr. Mallory, like Dr. Power, contemplates a reading in minutes instead of seconds.

In the examination of this method, let us begin with the simplest of all formulas, $\frac{l}{d} =$ *f* value, in which "*l*" is the focal length and "*d*" a hole-diameter expressed in the same terms; for instance:

$$\frac{5 \text{ in. (focal length)}}{\frac{1}{2} \text{ in. (hole)}} = \text{a true } f \text{ value of } f{:}10.$$

Now let us see what is the effect of adding to the above formula the element introduced by Mr. Mallory (multiplying the divisor by ten), so that we would have:

$$\frac{5 \text{ in. (extension)}}{\frac{1}{2} \text{ in. (diameter)} \times 10} = \text{a quotient of } 1.$$

If there were no conversion of seconds to minutes and if this quotient were read as an *f* value, the required exposure would be, by comparison with the preceding problem:

$$10^2 : 1^2 = 100{:}1$$

But Mr. Mallory's field formula calls for reading minutes for seconds in calculating the exposure, so that this resulting exposure would be represented by 60. In my opinion, the use of the Mallory constants will result on theoretical grounds, in exposures 60% of normal; and such has been the result of my many attempts based on them.

I have had no experience with "the Watkins pinhole lens," nor have I subjected his system to analysis. I have nothing to say, therefore, about the Watkins method, further than to quote Dr. Power: "It (Dr. Power's method of determining exposure) has also been adopted by Mr. Alfred Watkins." If so, it is subject to the same inconveniences, if not to some of the inaccuracies.

If the reader has found my foregoing analysis sound, he may ask how, then, is it that both Dr. Power and Mr. Mallory seemed to substantiate their theories by elaborate tests, and in practice; and the question will be quite fair and practical — the proof of the pudding being in the eating. I do not doubt that strict application of Dr. Power's rule to any given hole will bring the exposure within the latitude of the plate, but the apparent simplicity of the rule disappears in actual practice when one has applied it and obtained an *f* value of say *f*:25 or *f*:82. He must then square this *f* number, and work out a problem in proportion between that square and the square of some other number occurring in his tables or meters. This is tedious, even if the subject will wait, and one is tempted to

PSYCHE — CLARK H. RUTTER

Second Prize, September Senior Competition

do one of two things, as short cuts, which may lead to either success or failure; he may be tempted to compute the *f* value at the given extension for some other hole than the one to be used, in the hope of landing on a normal *f* number, and then work "the transition from one hole to another;" or he may be tempted to use the next higher number to the indicated one which occurs in his tables. In the first case the error in the relative values is fruitful of trouble. In the second case the rule is in great measure abandoned. In both cases the error, whatever it may be, is at once multiplied by sixty. Even if one has the patience to carefully work the ratio of the squares, he is likely to count *f*:11 and *f*:22 as sufficiently close for his purpose, and square these numbers instead of *f*:11.3137 and *f*:22.6274 as he must needs do in dealing with quantities which are one-sixtieth of the final result.

I may sum this all up by saying that the Power rule is based on errors that are not wholly negligible if scientifically accurate exposures are to be determined; that in practice one can save the apparent simplicity of the method only by the employment of short cuts and factors of safety; and that the failures and uneven results are due more to these short cuts than to the "approximate" character of the rule itself.

My own inquiries in this field were directed toward determining a series of diameters to which a normal series of *f* numbers would apply, in the use of which there need be no

temptation to make short cuts, nor any need for factors of safety. The reader will not be interested in the details of my calculations, for the results reveal the method. The diameters chosen as the result of my study are, in millimeters:

1.25 0.884 0.625 0.442 0.313

These diameters are the very approximate quotients of one centimetre divided, respectively, by:

8 11.3137 16 22.6274 32

These divisors are of course the accurate *f* numbers, usually marked on lenses and in tables and meters as

f:8 *f*:11 *f*:16 *f*:22 *f*:32

It will be seen that this series of diameters have the true *f* values above for a theoretical unit focal length of one centimeter, and for convenience in the field I have them so marked.

With such a series of holes, whose sizes are practical for all purposes (including the largest, oftenest used for viewing the image) calculation of exposure is at once simple, direct, and accurate. Exposures for the above series of stops are found in all tables and on all meters; and for them the experienced photographer needs no tables. Having read the exposure for the chosen pinhole, the next step in the procedure is based on the law that the amount of light falling on a given area from a given point varies inversely as the square of the distance. The extension is measured in centimeters, and the required exposure is found by multiplying the reading, for the stop chosen, by the square of the extension (in centimeters). There is no conversion from seconds to minutes; the result is final, and scientifically correct.

It will be seen that my approach to the problem has been different. Others have begun with established sizes of pinholes, and sought to deduce a formula from experience with them. I have begun with the formulas of the *f* system and established my sizes of hole from them. I have used the centimeter as my unit distance base, because it is a unit small enough to yield *f* values most commonly in use. Mathematically, the inch would be as good a unit, but it is open to two objections. First, since all of the practical sizes of holes lie between 1-25 and 1-100 of an inch, a series within these limits, referred to a unit distance of one inch, would have to be expressed by *f* numbers less convenient in use because less familiar to the operator. Second, the inch is so large a unit that measurements in inches would have to take note of fractions less easily squared mentally; whereas the fractions of a centimeter in the extension can always be practically disposed of by a slight change of the extension itself. A steel tape one meter in length, marked off in centimeters — a little thing for the pocket — is the only accessory one needs, and with this in hand, one need not even acquire any knowledge of the metric system of linear measure.

After refusing to accept Dr. Power's and Mr. Mallory's practical tests as final proof of the entire soundness of their conclusions, I hesitate to submit my own tests in support of mine. The latitude of plates and films is generally so great that only the thoroughgoing methods of a research laboratory could add much weight to one's reasoned conclusions in this matter. I would have been content to waive such tests of my method, and proceed to risk my practical work confidently on the soundness of my figures; but still I had to have some practical proof that my holes had been made of the specified sizes, and, incidentally, the proof of that was, so far as it goes, proof of the method; and so the records may not be without interest to my readers.

Six exposures were made on plates from the same box, on a landscape uniformly lighted through the six. One of the exposures was made with a lens; the others in succession through the series of five holes, in accordance with my system. All of the plates were

ARCH, BLAIR HALL — WILLIAM D. SPEAR

Honorable Mention, Second Annual Competition

developed in one tray with a normal developer, for four minutes. Prints were made with uniform exposures from six negatives, on the same paper, and developed for the normal time. The differences between these prints — aside from the differences of diffusion — are so slight that they would not be distinguishable, probably, in their half-tone reproductions.

Having, necessarily, written so much in criticism of Dr. Power's and Mr. Mallory's findings on this subject, I do not like to close this article without further grateful acknowledgment of my debt to them for their investigations. Without patient study of their work, I would not so soon have found the key which, I believe, unlocks the final truth of this vexed question of pinhole exposures. I owe a similar debt, through correspondence, to Mr. Edward Heim of New York, who has for twenty-five years used successfully a series of three holes based on a unit distance of one inch.

To sum up the whole matter briefly: all of the troubles in calculating pinhole exposures are due to the use of holes that do not conform to the *f* system; and the consequent introduction of uncertain quantities into the problem; and the remedy is to have holes made so that each shall, in truth pass exactly one half of the light passed by the next larger, and in conformity to a simple normal series of *f* numbers, based on the unit of measurement of the extensions.

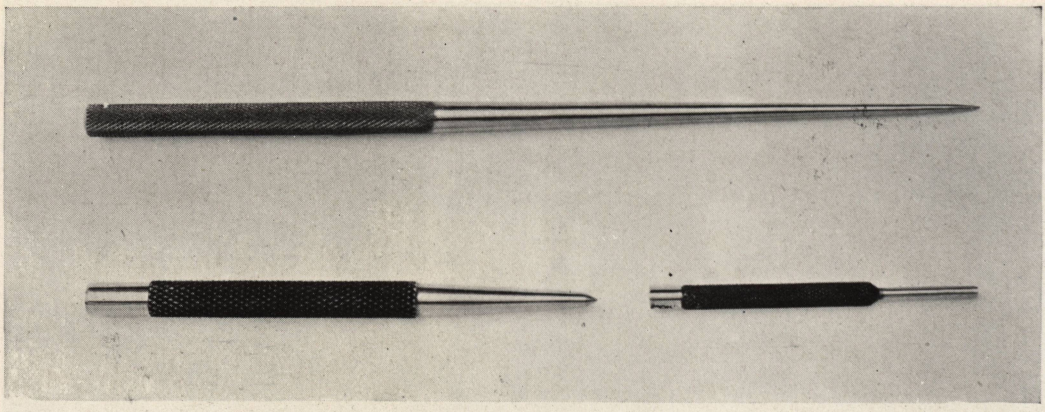


Fig. 2 H. G. PEARCE

COMMERCIAL PHOTOGRAPHY

HARRY G. PEARCE

PHOTOGRAPHY today plays a very important part in the advertising world. In looking through the advertising pages in the big magazines, we see on almost every one of them cuts that have been made from photographs. Very few photographers realize what an important part their work plays in the field of advertising. Expediency and speed of production in too many cases are the only considerations. A little more time and trouble spent in making the original negative greatly reduces the work required at other stages in the production of the finished picture and, at the same time, it increases business for the photographer because it enhances the quality of the results.

When a print is received at the point of publication it is usually sent to the art department, where it has to be retouched until it will make a good reproduction. There is so much of this to be done that publishers and photo-engravers who do a large volume of business usually have a department for this retouching of photographic prints. Their works consists in putting in highlights, strengthening lines, blocking out certain portions, changing the background and sometimes putting in a new one and very often, when they get through, the whole print is nearly completely covered with Chinese white and India ink. Any lettering there may be on objects in the photograph almost invariably needs to be touched up.

My object, right along, has been to do as much as possible of this work before the negative is made, thus eliminating much of the work needed later and making the finished half-tone more photographic in appearance. Why leave all this work for someone else to do when it can be done in the studio by spending a little time and thought on the arrangement and lighting of the objects photographed? On my negatives I always try to bring them to a point where retouching can be reduced to a minimum or done away with entirely. It is not possible to do this in every instance. There are some effects that can be obtained only by hand work on the prints.

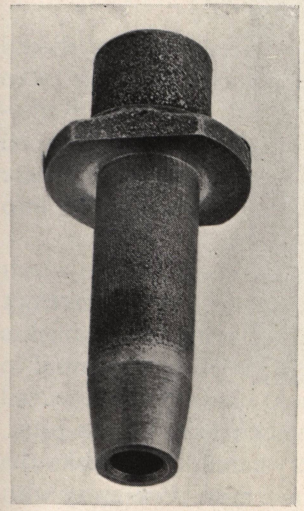


Fig. 1 H. G. PEARCE

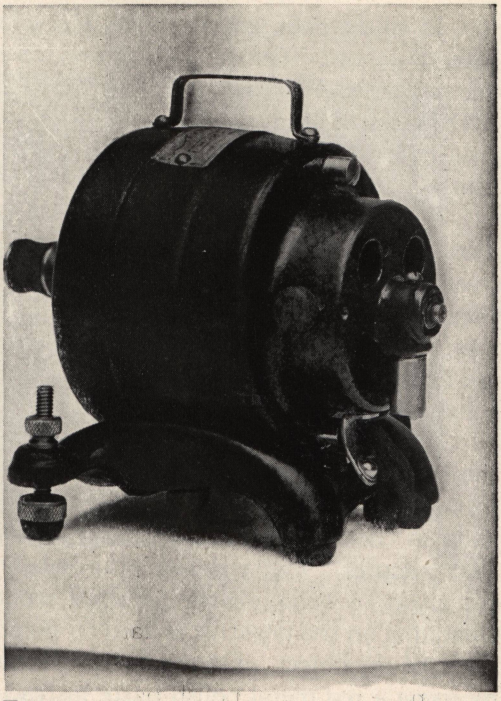


Fig. 4 H. G. PEARCE

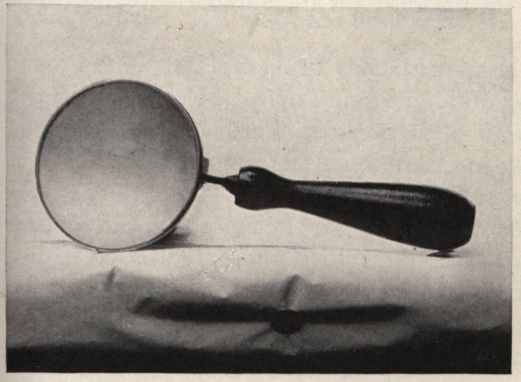


Fig. 3 H. G. PEARCE

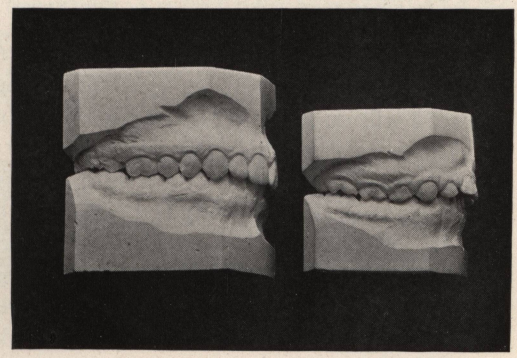


Fig. 5 H. G. PEARCE

In all the photographs I have made for reproductions, the one object in my mind has been to do away with retouching and, consequently, much of my time is spent in arranging the objects and obtaining the desired lighting effects before making the exposure. All this preparation sometimes takes as much as an hour, but I consider myself well repaid if the resulting negative and print are satisfactory. I have found, many times, that my prints are accepted where others have been turned down.

Cuts for advertising are not supposed to be "artistic," in a sense, but they should show the object as it is, bringing out all its qualities and good points. Shadows often cover up a good many of them, so it is often necessary to do away with shadows. Reflections are unsightly if they are too strong. Redundant highlights in the wrong places spoil the effect. Lettering, if there is any, should be brought out as it is in the original. There are innumerable things that can spoil an advertising picture if they are not taken into consideration either before or after making the exposure.

The cuts used to illustrate this article are from prints made from negatives on which there has been no retouching or hand work of any kind. Figs. 1 and 2 illustrate the attempt to do away with all shadows, keeping the white background and having the highlights show in their correct positions. Plenty of detail is shown, which is always essential in such pictures. Fig. 3 shows an unsightly background that would have to be retouched out either by opaquing the negative around the object or by blocking out on the print. Opaquing on the negative is hard to do and if it is not done very carefully it breaks the edges of the object. On the mirror in this picture reflections have been done away with by using a red metal polish paste instead of putty, which is often used for that purpose. By using red paste I have been able to show the curved surface that this mirror has, a little more paste being used at the upper edge, to increase the effect. When this article is photographed flat, by using the reflector, a perfectly white background can be obtained, so that no hand work need be done and the half tone negative may be made direct from the print. Fig. 4 shows the result of using reflectors on a bulky object. There is very little shadow here. In many cases it is not desirable to do away with shadows entirely. Fig. 5 shows white objects against a dark background. The whites are not chalky. Heavy shadows have been done away with and there is detail and texture in the plaster of Paris. The objects were placed on a shelf with red felt for the background and the clear black is obtained by getting an even lighting which breaks the shadows in corners and ridges in the background felt. In Fig. 6 a cross lighting was used to bring out the texture in the cloth and a front lighting to show the lettering in the titles. This was all done by means of reflectors. The shadows on the background are eliminated by means of reflectors.

Although these cuts do not cover a very large field, they bring out the point I want to make, that care and time spent in arranging and lighting an object before making the exposure will do away with the necessity for a lot of subsequent hand work on the print.

In photographing glassware, I usually rub red paste over the outside and, if it is a hollow vessel, I fill it with a dark fluid. This gives perfect results. For jewelry and silverware I also use the red paste to break reflections and I use a grey background, eliminating cast shadows by means of reflectors. Stoves are often difficult to photograph successfully on account of the extreme contrast between the black parts and the polished nickel. I use putty on the bright parts and if there are letters in the nickel I usually cover the letters with stove black. On letters on the black parts of the stove I use a little gray water paint. Then, when the reflectors are arranged correctly, I am all ready to make the exposure.

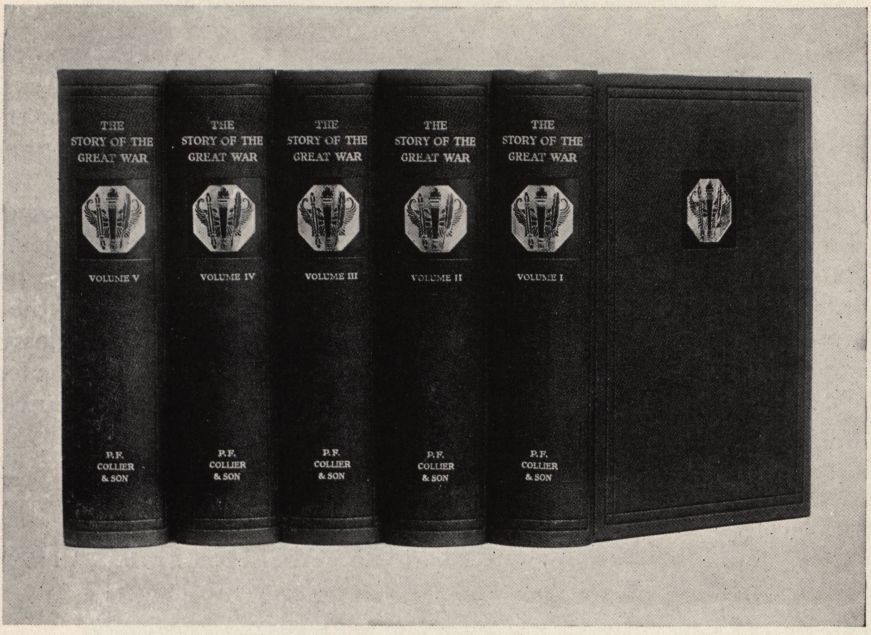


Fig. 6 H. G. PEARCE

Furniture is difficult to photograph properly and it always calls for orthochromatic or panchromatic plates and suitable ray filters. This I will deal with at a later date as there is not room here to say what I would like to say regarding this particular branch of commercial work.

As to my apparatus for gaining the results I desire, I use an easel with a shelf, a square cage covered with draughtsman's tracing linen, two 12″ square mirrors and white blotting paper. For backgrounds I use red felt, white paper and gray cardboard mounts. I fasten the cage to the easel and this acts as a diffusing box. I then place the object to be photographed on the easel shelf with the necessary background in place and focus the image, making it the required size on the ground glass screen of the camera, which is an 8 x 10 Eastman View. Then I place the reflectors, trying them in different positions until I get the desired lighting. If I find I cannot break the shadows with the white blotting paper, I bring the mirrors into use and reflect the light from the window through the tracing linen. If I want the light from above the object, I reflect light to a piece of white blotting paper placed above the object. When I get things arranged so that everything looks to be as I want it, I go back to the camera and study the image on the ground glass. Sometimes I find it necessary to make a few changes, if not, I go ahead and make the exposure.

All this preparation takes considerable time, but I believe it is time well spent, for it saves a lot of work afterwards both on the negative and on the print.

I always try to give a full exposure and I always use pyro to develop the negatives, as I find it gives great softness and excellent printing quality. I use the following formula:—

1 Pyro..... 1 oz.
Water..... 16 oz.
Oxalic acid..... 10 grains
2 Sodium sulphite in 16 oz. water to hydrometer test 60.
3 Sodium carbonate in 16 oz. water to hydrometer test 50.

To develop, take 1 ounce of each and add 4 to 6 oz. water .

I vary the carbonate according to the nature of the object photographed and according to the exposure.

If I find I have a negative that is defective in any way, it goes to the waste pile. I never try to patch up a defective negative or try to force an imperfect print on a customer. In my estimation a defective negative is as useless as a broken one. It does not pay to try to pass bad prints. I always do the work over again from the beginning.

I have found that the best plate to use for commercial work is a double coated orthonon, my choice being the Standard Orthonon plate. I very seldom have to dodge in printing, as my negatives run pretty even in contrast on account of the time I spend in arranging and lighting the subject before exposure. I always use glossy printing paper and add a little more bromide to the developer than is called for in the formula. A print of a tone tending toward green rather than blue makes a better reproduction, although the blue-black is more pleasing to the eye.

SOME THOUGHTS ON ARTISTIC ANATOMY

MERVYN THOMPSON

IT IS not an easy task to reconcile two subjects so far apart in the minds of most readers as anatomy and the fine arts; but if prejudices, early imbibed, be thrown off, it will be found that there is no science, taken in a comprehensive sense, more fruitful of instruction, or leading to more interesting subjects of enquiry than the knowledge of the animal body."—Sir Charles Bell, K.H.

It may be asked, what may the artist gain by the study of anatomy? A more direct question applicable to readers of this journal is—what may the photographer gain by that same study?

"Anatomy may be defined as the examination of that structure by which the mind expresses emotion and through which the emotions are controlled and modified; it introduces us to the knowledge of the relations and mutual influences which exist between the mind and the body."

To the artist, therefore, the study is of considerable importance. The photographer who is at the same time an artist, as making a distinction from those who practice photography in a more commercial sense, seeks to use photographic processes as a means of artistic expression.

In the early days of Fox Talbot's calotype, a successful painter, David Octavius Hill, took up photography as a quick means for making a large number of portrait sketches for a great group. Unfettered by photographic convention and guided by an artist's knowledge and tastes, he produced portraits which for pictorial quality have perhaps never been surpassed.

The artist and the photographer are akin. While the one seeks to achieve results by natural genius and trained dexterity in the manipulation of paints and brushes, the other, having the same aims and objects, accomplishes them by the aid of photographic processes. The very imperfections of some of these processes make it imperative for the photographer to acquire practice in the use of paints and brushes, in order to eliminate or correct those inexactitudes of form and tone.

SPANISH LADY — HOLMES I. METTEE

Honorable Mention, Second Annual Competition

A very large number of retouchers work from a mental picture of a standard face and talk vaguely of modeling and expression, without the least knowledge of the construction of the human face or the muscles controlling and responsible for the interpretation of human emotions.

Many operators, too, work in a manner that may be best described as haphazard. How many portraits one sees with a bad perspective, an ugly hand or arm, rendered out of proportion by an ugly pose, the choice of a wrong view-point or a lens of unsuitable focal length? Given a responsive sitter, an operator producing a negative with such an imperfection is guilty of wasting a plate, and nothing more. Had he or she acquired a knowledge of anatomy, the probability is the fault would have been observed and corrected before the exposure was made.

The study of anatomy does not teach one to use pencil and brush, or does it help one to acquire knowledge and practice in the application of photographic processes; but it teaches one to observe nature, to see forms in their minutest variety which, but for the knowledge of certain elementary principles, would pass unnoticed.

It may be possible to acquire good taste by familiarity with standard works of art, and by association and conversation with those who have already acquired the power of execution, which, should one desire to achieve oneself, will be found to depend upon much deeper sources of knowledge as well as natural genius.

The artist by a study of nature acquires a true knowledge, in contradistinction to those who adopt a standard based upon some of the finest works of antiquity, because many of these works are best regarded as models of perfection and are probably unlike what has existed in nature.

The photographer, be he operator or retoucher, can scarcely call his education complete or be competent for the finest work, without some real knowledge of the form, construction and proportions of the human body.

Apart from the proportions of the body the all-important question of expression, the source of expression and the reason for it, is a study that should be considered essential in the photographer's training.

Expression is of even more consequence than form; it will light up features otherwise heavy, and give charm to a face that may otherwise be considered ordinary.

The operator, by the skilled use of his apparatus, has the means whereby to produce a portrait of his sitter. How is it possible for him consistently to achieve perfection, unless he has the ability to make accurate observation of nature's slightest characteristics?

The retoucher, applying his skill to the correction of photographic imperfections, of lighting, etc., has a difficult task rendered more difficult still by having only a negative and not a positive image to work upon. It is hardly conceivable that the highest standard can be reached without an intimate knowledge of the structural complexities of the human countenance!

What then are these characteristics and complexities? Can we define them? We know that the eye is one of the chief features of expression. A study of anatomy teaches us that no less than three muscles co-operate in the opening and closing of the lids. Of the facial muscles of expression, there are four attached to the eyebrow, four more move the cartilages of the nostrils, while there are no less than twelve muscles of the lips and cheeks, all powerful agents in expression. Then there are the muscles of the forehead.

There have to be considered the effect of emotion, the changes that occur in the human structure from infancy to adolescence and thence to maturity and age; the infinite variety of feature, stature, coloring and expression, the characteristics peculiar to types and nationalities, and many problems of philosophy and physiognomy.

A retoucher working upon the head of an aged man must know what is the natural result of age, what of deformity: or to embrace generalities, what of thought, of refinement, of surprise, of irritation, of sensuality, of nobleness and grace, of mirth and sorrow. Without such knowledge it were surely a presumption to attempt the work at all!

It has been said that anatomy is not to be displayed, but its true use is to beget an accurate observation of nature in those slightest characteristics which escape a less learned eye, that anatomy is the true basis of the arts of design, and that it will infallibly lead those to perfection who, favored with genius, can combine truth and simplicity with the higher graces and charms of art.

Sir Charles Bell, in his "Anatomy and Philosophy of Expression," says: "By anatomy in its relation to the arts of design, I understand not merely the study of the individual and dissected muscles of the face, or body, or limbs, — but the observation of all the characteristic varieties which distinguish the frame of the body or countenance. A knowledge of the peculiarities of infancy, youth, or age; of sickness or robust health; or of the

OLD MILL — KARL SUCHY

Honorable Mention, Second Annual Competition

contrasts between manly and muscular strength and feminine delicacy; or of the appearances which pain or death present, belongs to its province as much as the study of the muscles of the face when affected in emotion. Viewed in this comprehensive light, anatomy forms a science, not only of great interest but one which will be sure to give the artist a true spirit of observation, teach him to distinguish what is essential to just expression, and direct his attention to appearances on which the effect and force, as well as delicacy of his delineations, will be found to depend."

To acquire a knowledge of artistic anatomy is surely within the reach of everyone; art classes are held in almost every provincial town and the libraries are open for the perusal of all.

"Photography is a worthy profession," the dignity and status of which should be upheld and elevated. Progress both individually and collectively can only be achieved along the paths of evolution, which interpreted can be expressed as — the groping after and acquiring of knowledge.

To those interested in the subject, the value of which is only touched on in this article, the following works are commended:

"Anatomy and Philosophy of Expression," by Sir Charles Bell, K. H.; "Anatomy for Art Students," by A. Thompson; "Surface Anatomy," by B. Windle and Manners Smith; "Landmarks and Surface Markings of the Human Body," by L. B. Rawlings; "Surface Anatomy," by T. G. Moorhead.

A B C OF PHOTOGRAPHIC CHEMISTRY

JULIEN J. PROSKAUSER

HE writer has been asked times innumerable: "Why are there no books on the chemistry of photography, and why doesn't AMERICAN PHOTOGRAPHY or some other photographic publication take up the subject so that the veriest novice can understand the very basis of his picture-making hobby?" To the answer: "I have seen dozens of articles in AMERICAN PHOTOGRAPHY along those lines," there almost invariably comes the reply: "They are too deep for me." Therefore, in the following brief outline of the foundation of photographic chemistry, the writer attempts to give, concretely, the "A B C of Photographic Chemistry."

Before starting, however, he would call the reader's attention to the "Handbook Series" published by the American Photographic Publishing Co., in which will be found a book on elementary chemistry entitled "Chemistry for Photographers," and also to "Elementary Photographic Chemistry," published by the Eastman Kodak Company. Now to our subject.

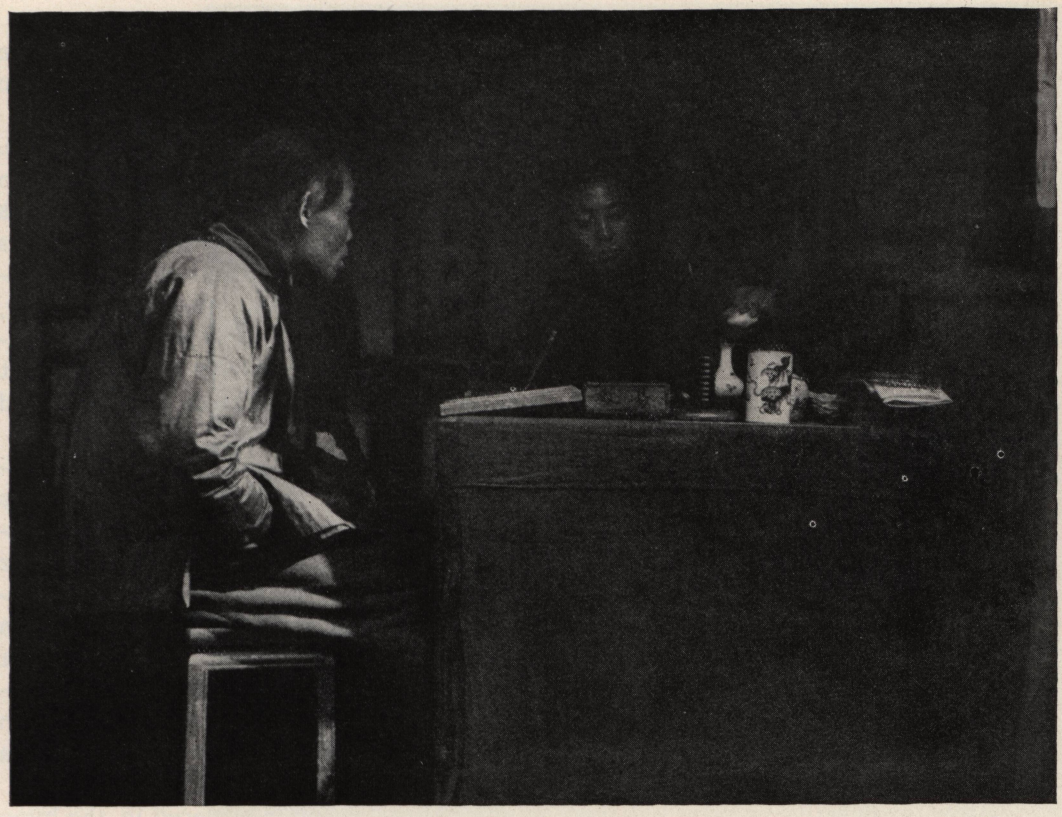
On the compounds of silver with chlorine, bromide or iodine, and their affinity to light, rest almost all the photographic processes. A film, plate, or printing paper is simply a base for a sensitive emulsion made so as to hold silver bromide or silver chloride. The sentence above was worded so that the reader may visualize something tangible on his film, plate or paper base.

In making a film, gelatine is used as the base to hold the sensitive silver salts. This gelatine is a very complex substance, made from the bones and skins of animals. The base for a plate is any thin glass, chemically pure, on which the silver bromide emulsion can be flowed. The base for a print is a specially made paper, free from impurities, and either a silver chloride compound (in daylight or printing-out paper) or a silver bromide (bromide or developing-out) is placed on it.

Any exposure of the film, plate or paper which has been coated with a silver emulsion which is said to be "sensitive to light," produces a change in this emulsion. But, as this change is not visible, to discover what it is we have to place the exposed emulsion in a developer. This developer takes the bromide away from the silver, and leaves this behind in the form of a black "image." This image is formed of metallic silver. This change is called in chemistry a "reduction." The reduction of bromide of silver to metallic silver is therefore the story of the photographic art.

The result of the reduction tells the story of the picture-to-be. If the silver compound was not exposed to the light long enough when the exposure was made in the camera, and development is carried on for the normal time, the negative is what is termed "thin." By thin is understood that not enough metallic silver was deposited in the development or reduction of the silver salts, to form an image which is printable. When the silver compound was overexposed in the camera, after normal development we have a "dense" negative. We understand dense to mean that so much silver bromide was reduced to metallic silver that the image is hardly translucent.

The developers in everyday use are metol (elon), pyro and hydrochinon. Metol is a paramidophenol base which is treated with methyl alcohol, which treatment produces methyl-paramidophenol, as the methyl attaches itself to the base. Elon is the trade name



THE FORTUNE TELLER — CHARLES H. KRAGH

Honorable Mention, Second Annual Competition

of mono-methyl-paramidophenol, which some believe to be better than the ordinarily marketed metol. Pyro is an abbreviation for pyrogallic acid and is made from gall nuts imported from China. It is sold in two forms, a flaky powder and a crystal. The writer always uses pyro in crystal form, because experience has taught him that the powder is so light that tiny particles of it settled all over his darkroom whenever the box was opened. Crystal pyro does away with this.

Hydrochinon is derived from benzol which has been converted into aniline, and afterwards oxidized to get the hydrochinon. It is rarely used alone, but when used with elon gives remarkable density to plates, films or papers. One of the present day uses of an elon-hydrochinon formula is in the development of X-ray plates or films.

Now we have the emulsion explained and also its reduction. In the last three paragraphs we have named the principal developers which do the reducing. But, as no developer will reduce alone, because it must be in an alkaline solution, we have to go to the next stage of the chemistry of photography.

To develop, or reduce, with any of the three developers named above, we add certain chemicals necessary to dissolve the developer in an alkaline solution. Developers of high developing or reducing power, such as pyro or elon need only an alkaline carbonate, while hydrochinon, which may of course be used with them, develops with greatest energy when a caustic alkali is used. In "Les-Lite," a developer made up by the writer and recently discussed in AMERICAN PHOTOGRAPHY, the remarkable energy of the solution

was due to an excess of caustic soda.

Ammonia, a very powerful alkali, was used with pyro in the early days of dry plate photography, but has been discontinued in recent years. The principal sodas added to all developers to make them alkaline for use are sodium carbonate and sodium sulphite.

The sodium carbonate is the alkali and the sodium sulphite is the preservative. When developers are in alkaline solution, they have a great affinity for oxygen. To keep the developer in solution and to prevent its oxidation by the air, the sodium sulphite is added. With pyro, the value of sulphite is most readily seen. Pyro, when oxidized, is yellow in color and if we developed a film in pyro and carbonate solution alone, the resultant negative would be very yellow because the image would consist, after development, partly of oxidized pyro and partly of metallic silver. When sulphite is added, the negative, while still slightly yellow after drying, will be better for printing. When a great deal of sulphite is added to pyro, the resultant negative is almost like an elon-developed negative in color.

Thus we have the chemistry of emulsion and developer. Now we come to the chemistry of fixation, or the final step, chemically, in negative or print making. There remains in the paper or the film or plate, after development or reducing, some undeveloped bromide. To preserve the plate and make it insensitive to light, this silver bromide must be dissolved. The chemical universally used for this final step is called "hypo," an abbreviation for hyposulphite of soda. This is an old name, and modern chemists call it sodium thiosulphate. The textbooks say that this is made by boiling together sodium sulphite and sulphur, the latter combining with the former, but, according to the Eastman Research Laboratory, hypo is now usually made from calcium sulphite residues, calcium thiosulphate being first made by the above process and then converted into the sodium salt by treatment with sodium sulphate.

After the negative or print has been developed and rinsed, it is placed in the hypo bath until all of the silver bromide is dissolved. It is easy to tell when the silver is gone for, after development, the undeveloped bromide of the emulsion is still yellow. It might be more explicit to explain that this yellow is visible from the non-emulsion side more readily than from the film side, as the black of the metallic silver is usually to be seen on the emulsion side.

Fixation of the emulsion may be accomplished by the use of hypo alone, but as carelessness in rinsing paper or plates or films before transferring them to the hypo bath means that more or less developer remains on the developed object, it is advisable, in order to prevent the hypo bath from discoloring or oxidizing to add to it, as a preservative against this, sodium sulphite.

If the hypo bath is kept in a slightly acid state it is found that the alkali carried over by the adhering developer is immediately neutralized. Therefore, besides the sodium sulphite, an acid is also used in making up a hypo bath for fixation purposes. Then in warm weather, or even all year 'round, it is well to add a "hardener" to the acid fixing bath for the purpose of preventing the gelatine of the emulsion from becoming soft or swelling.

There are many acids used; some like sulphuric and others citric, but the standard is a 28% solution of acetic acid. Acetic acid is prepared, in its dilute form, as vinegar by the fermentation of alcohol. Commercial acetic acid rarely contains any harmful impurities and the photographer never finds trouble from this scource.

The hardeners used vary. Chrome alum, in spite of its name, contains no aluminum. It is a compound sulphate of potassium or ammonium sulphate with chromium sulphate. Its purity is usually high and it has far greater hardening power than ordinary alum. For-

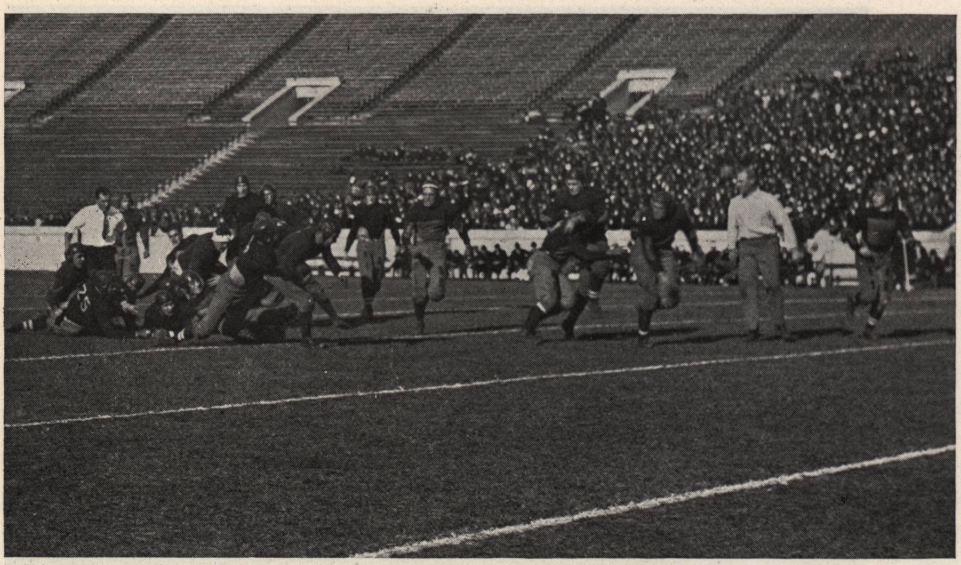
TRUANTS N. P. MOERDYKE

Pittsburgh Salon, 1922

maldehyde is also used as a hardener as a 5% solution when quick prints are to be made. A negative soaked for one minute in a 5% formaldehyde solution, after fixation is completed, may be boiled without the gelatine dissolving.

In making developers always dissolve the preservative first, unless you are using elon or metol. Then dissolve a little sulphite first, then the developing agent and then the rest of the sulphite. Always see that one chemical is *completely* dissolved before adding another. If you don't do this, you may get chemical fog when you develop. In the case of your sodas add the chemical to the water, not the water to the chemical.

In making up your fixing solution, always dissolve the hypo before adding the acid, hardener or sulphite. The best way is to add the sulphite, acid and hardener already dissolved. Never add acid sulphite solutions to a warm hypo bath. If you do the hypo will turn milky.



A MAN'S GAME C. B. WEED

A MAN'S GAME

For such pictures as this other qualities besides photographic skill are needed. The photographer must be agile and energetic, so that he can follow the game and be in the right place at the right time; he must know the game so that he can tell what is likely to happen under certain conditions; he must be able to work fast and must always be prepared for the unexpected and, above all, he must cultivate the almost uncanny instinct of the experienced speed photographer to expose just a shade ahead of time so that he can get the maximum suggestion of action. Technical problems as to suitable apparatus, kind of plates or films, can be solved only by practical experience, as different people have different ideas as to these things, and there is plenty of choice in the matter. Some like to use films; some think plates are more rapid and will not use anything else. There is plenty of action in Mr. Weed's picture and he was very fortunate in being ready to make his exposure at an opportune time. Anyone who is familiar with the game can easily anticipate what is likely to happen, if—. Made with a Graflex camera, 3¼ x 4¼, Cooke Series 2 lens of 5 inches' focal length, used at *f*:6.3, good light at 3.30 P.M. in October, exposure 1-350th second, Hammer Red Label plate developed with pyro-soda in a tank, enlarged on Artura Carbon Black.

CONCERNING SECOND-HAND APPARATUS

With most of the old photographers, amateur as well as professional, there was a kind of sentimental regard for any piece of apparatus which had done them good service, and they would no more have dreamed of sending one of their old cameras or lenses to the auction-room or second-hand dealer than the fox-hunter would doom his favorite mount to the shafts of a "four-wheeler." This feeling is now, however, in a fair way to become extinct. Improvements and modifications succeed each other so rapidly that the progressive worker has hardly time to become attached to a piece of apparatus before it is more or less out of date and has to be superseded. A glance at our advertising columns will show on what an extensive scale this changing of apparatus goes on, and a few words of caution and advice may be acceptable to many of our readers. In the first place, it should be remembered that even the best of apparatus cannot be used for any considerable amount of work without requiring a thorough overhauling, and a would-be purchaser should always make a point of having every article examined by a skilled workman before closing the bargain. As an actual instance of the necessity for this precaution, we recall a case in which a photographer paid a good price for a half-plate focal-plane camera, which he required for press work.

A close scrutiny did not reveal any defect, and a trial plate or two gave satisfactory results; he was quite satisfied — for a short time. At the end of a fortnight some of the slides became leaky, and on submitting them to a camera maker it was found that the light-traps, which were of metal, were so corroded that they were practically crumbling to pieces. These had to be renewed at considerable cost, and again all seemed well. Not long after this the shutter slowed down in an unaccountable manner, and on returning it to the makers it was found necessary to fit a new mainspring, the old one having lost its resiliency, though, temporarily tightened up for the purpose of sale, it appeared to be in good order. Altogether these repairs cost over ten dollars, to say nothing of the loss of time and the inconvenience to the owner. The expert overhauling would have transferred this loss from the buyer to the seller, who probably would have been quite willing to pay for repairs which were proved to be necessary. In the case of lenses by makers of repute, and for which a fair price is asked, it is advisable that they be submitted to their makers for a report on their genuineness, and also their present condition. Most makers will render this service for a very small fee. If the

INDUSTRY — G. W. SCHINKEL

purchaser relies upon his own judgment, he should not forget to examine the surfaces to see if the polish is intact. If this is in any way dulled, it will cause a general fogging of the negative, which is more noticeable in bright weather than in dull.

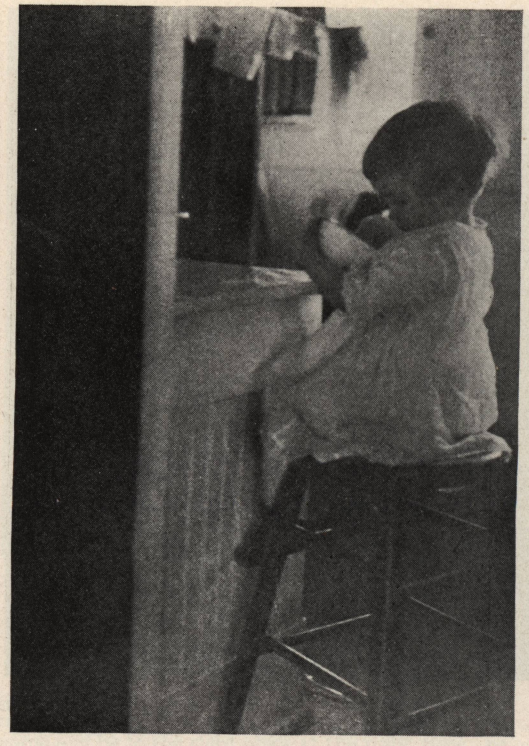
At the risk of being tedious, we must repeat the caution against sending money to strangers who advertise bargains in apparatus either in our own or other columns. Without any intention to be dishonest, the seller is apt to describe his goods in too glowing terms, and the camera "in condition as new" may be found to be well worn, though serviceable. But besides these, there are actual swindlers who have no goods to send, and the hardly less reprehensible ones who have "just sold" the article advertised, and send as near a substitute as possible. To recover a remittance from these gentry is, in the words of the proverb, "like getting butter out of a dog's mouth." However, anyone who is defrauded in this way has no claim for sympathy, as all reputable journals with "apparatus for sale" columns arrange to hold money on deposit until the goods have been accepted as satisfactory. In the case of photographers, the ordinary references to their stock dealers may be exchanged, and some such precaution should always be taken. — *British Journal of Photography.*

INDUSTRY

It is hard to make a picture of such a subject as is shown in "Industry" and make it really satisfying from the artistic point of view, because there are so many different things that are all equally interesting, and there is no definite dominating point of interest. We have to do what we can to make some one thing more prominent than anything else, so that it will act as a point of focus for the eye and we can do it by position or isolation in the picture space, by contrasts in tone, or by any other means that may be expedient. In Mr. Schinkel's picture, for example, one thing that might be done to provide unity of interest would be to print a good deal darker, so that all the scene is lowered in tone, and thus the steam from the funnel of the steamship would stand out as a prominent accent against the sky. This would tend to make it a picture rather than a record of an interesting scene and this is something like the sort of thing an artist would do if he were painting the scene; some one thing would attract his attention and in the picture he would emphasize this one thing and subdue everything else. It is in a case like this that one of the hand-controlled processes is useful, so that parts of the picture, such as barrel heads, etc. can be darkened and the contrasts of tone in the prominent object intensified. "Industry" was made in New York City with a 2¼ x 3¼ Ansco camera fitted with an Ansco anastigmat lens of 3½ inches' focal length, used at *f*:6.3, faint sun, 10 A. M. in November, exposure 1-25th second, enlargement on Artura Carbon Black.

DIRECT POSITIVES ON BROMIDE PAPER

For rapidly copying documents, articles in journals, line drawings, etc. ,a direct photograph on bromide paper is very satisfactory if the photograph is made through a prism to avoid reversal. A well-known example is the use of the Photostat machine, in which the operations of development and fixing are performed automatically after exposure in the camera, the paper being cut off from a roll, so that a great number of photographs can be taken in succession. This method, of course, produces a nega-



HALF WAY 'TWIXT HINDRANCE AND HELP

LOUIS A. DYAR

tive, and for much work a negative has no disadvantages. On most occasions, however, a direct positive is desirable, and such positives can be obtained on the bromide papers used for copying work, by two different processes.

The first method is the well-known one whereby the developed, but unfixed, print is bleached out in an acid permanganate bath, and the residual image of silver bromide exposed to light. This, on development, gives a positive black-and-white image. Good results are obtained by observing the following:

The exposure must be sufficient, so that development is complete in about two minutes, using the developer recommended for the particular paper used. After washing the print for five minutes it must be bleached by bathing for one minute in the following bleach bath:

Potassium permanganate	30 gr.
Sulphuric acid (strong)	150 min.
Water	32 oz.

Rinse and immerse in a dilute solution of sodium bisulphite to remove the brown stain, working in full daylight, and rinse and develop in the developer first used; then fix and wash in the usual way.

Any brown stain that remains in the print can be removed by bathing in a weak solution of potassium cyanide, being careful to take the print out the moment the stain disappears, or the silver image itself may be attacked.

A second method, worked out in the research laboratory of the Eastman Kodak Company, calls for developing in the usual manner, converting the unexposed silver bromide into silver sulphide and then removing the residual silver image, leaving a positive image of silver sulphide.

The exposure may be made in an ordinary plate holder, keeping the paper flat with a sheet of clear glass, and must be adjusted so that development is complete in two or three minutes in the following developer at 70 degrees F.:

Elon	8 gr.
Hydrochinon	150 gr.
Sodium sulphite	3 oz. 100 gr.
Sodium carbonate	3 oz. 100 gr.
Potassium bromide	50 gr.
Water	32 oz.

This developer will keep well.

It is evident, in view of the fact that this developed silver image is subsequently removed, leaving a clear white background, that all the exposed silver bromide must be reduced to silver during development, or the highlights of the final positive will be stained or fogged. On the other hand, if the print is overexposed in the first place, spreading may take place and fine lines will be lost.

After development a rinse only is needed before the print is put into the darkening bath, where it remains for two minutes at 70° F., when the unexposed silver bromide is converted into sulphide. The bath is made up of:

Sodium sulphide (crystal)	1 oz. 330 gr.
Water	32 oz.

It will be safer to bring this solution to the boiling-point and allow to cool before using, in order to precipitate the iron present. The final color of the print, as well as the degree of contrast, will depend on the strength of this bath, which may be used almost indefinitely. A weaker solution will give yellowish-green tones, but if the above strength of the solution is maintained, almost black lines are obtained. Rubber fingertips should be worn, as the solution may affect the finger nails.

The print, after a few seconds' washing, should be placed in the following bleach bath until the highlights are perfectly clear, which will occur in about three or four minutes:

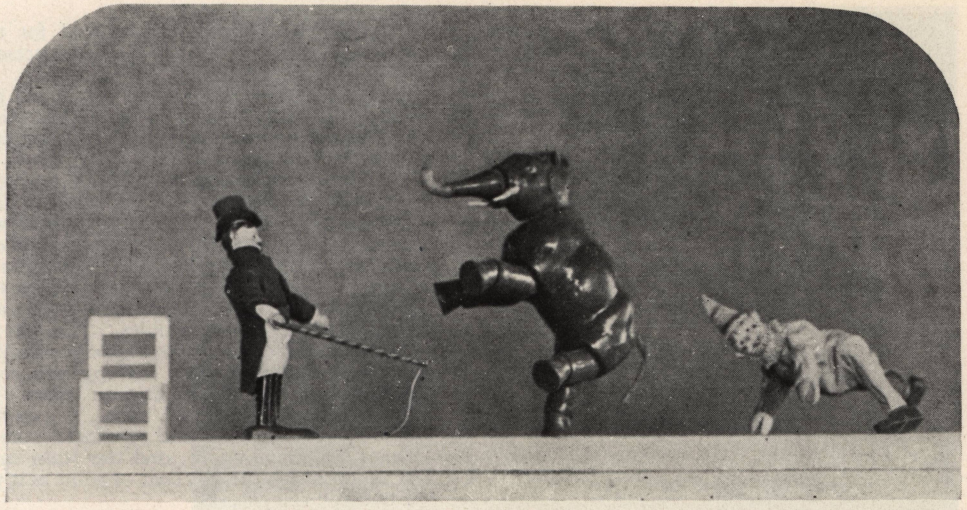
Potassium ferricyanide	11 oz.
Ammonium sulphocyanide	11 oz.
Water to	32 oz.

The temperature of the bleaching bath is important. It may run from 65° to 75° F., but it should not go beyond this, or the silver image may be attacked and the bath is liable to decompose. The bath ripens with age, and works best when it has turned a greenish color. Ammonium sulphocyanide may be replaced by the potassium salt without changing the action.

In view of the fact that ammonium sulphocyanide dissolves silver bromide, the print is automatically fixed during bleaching. After bleaching, the print should be well washed for five or ten minutes and dried as usual.

The finished print will have a slightly yellowish cast in the highlights, which can only be removed by continued use of the ferricyanide bath, which is not desirable. Local yellow stains are due to the presence of silver bromide along with the silver image previous to sulphiding. It is important, therefore, to prevent this by correct exposure and full development. At all stages of the process the print must be agitated to prevent stains caused by uneven action of the baths.

In actual practice the process takes very much less time than is taken to describe it. Not more than twenty minutes are needed to carry it through, including the developing, sulphiding, bleaching and washing. — *British Journal of Photography*.



HUMPTY DUMPTY — SIMON JOCHAMOWITZ

HALF WAY 'TWIXT HINDRANCE AND HELP

Natural, unposed, unarranged snapshots like this one often are of greater value than the most expensive product of a professional studio. When, in addition to naturalness, there are artistic qualities such as interesting composition and good tones, the value is greatly enhanced. Mr. Dyar's children's portraits always are interesting and this one is no exception. We think that about half of the black strip on the left hand side might be trimmed off; there is rather too much of it. Made with a Rexo 3¼ x 4¼ camera, fitted with a Dagor Anastigmat lens of 6.8 inches' focal length, used at U. S. 4, good light at 3 P. M. in January, exposure ½ second, Eastman N. C. Film, developed with Rodinal, printed on Royal Velox from an enlarged negative.

BROMIDE IN THE DEVELOPER

In summer, sometimes it is necessary to use a little bromide in the developer, but it is always a good plan to use it as little as possible or to do without it altogether. Test its action with the plates you are in the habit of using and try to regulate the exposures so that you can dispense with the necessity for using bromide as it has a tendency to clog up the shadows. When a plate is overexposed, remove it quickly from the developer, rinse it and put it into a developer containing bromide. This should be done with as little delay as possible, otherwise the plate will be developed before the bromide can have any effect on it.

HUMPTY DUMPTY

In making still life pictures where the arrangement, lighting and everything are under the control of the photographer, there is very little excuse for technical shortcomings. The picture should be properly focused and the exposure should be approximately correct. Mr. Jochamowitz has selected unusual and interesting playthings for the "toyland" study and has arranged them with considerable pictorial insight, but such things as these should be focused clearly, and if an anastigmat lens is used the picture should exhibit the crisp, sparkling definition that is possible with such a lens. If softness of outline is desired, it is better to get it by the use of a suitable lens than by throwing the image out of focus. It might have been better in this case to have stopped down a little and increased the exposure accordingly. Made in Peru, South America, with a 3¼ a 4¼ Graflex, Bausch and Lomb Tessar lens of 5½ inches focal length, used at *f*:4.5, bright light at 2 P. M. in January, indoors, exposure 1-5th second, Seed 30 Gilt Edge plate developed with pyro, enlarged on P. M. C. Bromide.

TO REMOVE WRINKLES FROM BACKGROUNDS

Wrinkles from any cause whatever (provided the paint is not cracked off) may be removed and the background made as smooth as though it had been painted on your frame or stretcher.

New backgrounds are often wrinkled by the ignorant while they are being mounted on the frame, by the fingers touching the back or the front of the background when it is being unrolled. Avoid touching the ground and never squeeze or crush it with your fingers; let it rest gently on the open palms of your hands while your assistant tacks the top to the frame, first one end, then the other end, and then working from the center to both ends of the top at the same time. This should be done with the frame standing upright. Never lay the frame on the floor to stretch a background as you will probably ruin it.

After the top is tacked begin on the sides at the bottom and work upward. Do not drive any of the tacks all the way in, you may have to remove them to smooth out any sagging or wrinkles. Then if the background has no extension tack the bottom. All tacks should be about six inches apart.

Wherever any sagging or wrinkles appear, remove the tacks one at a time, stretch the ground gently

WATKINS GLEN JOHN SPRENGART

and replace the tack, working toward the nearest corner. Do this until your ground is as smooth as if painted on your frame. If, however, this is not accomplished by the above, place the background on two or three chairs face down and place a pail of boiling water underneath (keep the water steaming) for an hour, then stand the ground upright and stretch out any sags or wrinkles as before, as the paint will have become softened enough to allow you to do a good job this time. Then drive the tacks all home.

If your ground has an extension, lay a strip of board along the bottom edge and nail through it to the frame to hold the ground until it is thoroughly dry, which will take: wenty-four hours, when the strip can be removed. The nail holes will not show in the photo. Have the nails six inches apart — as you did the tacks, or the ground will shrink unevenly.

If you use a background carrier for your grounds, you will have to mount them on frames first and proceed as above. Allow them to dry thoroughly, when they may be removed and remounted on the carrier rollers. The wrinkles will again shortly reappear. Can't fix them.

To remove small indentations, spray the background gently with an atomizer containing water which has been boiled and allowed to cool. In fact, the atomizer may be substituted for the steam process if you care to take the time necessary to accomplish the result.

Before trying this process on an old ground be sure to dust it thoroughly or it will stain. Brush it vigorously with a soft feather duster until every particle of dust is removed.

To save a background that has been water-stained, if you discover it before it has begun to dry, lay the ground down on the floor and flood it with clean water. Do it quickly and all over, but do not attempt to use a brush or cloth to cover parts you failed to get wet — pour water on them. Then stand it up and allow it to dry. All sides must be tacked as in method for removing wrinkles. This will often save a ground that otherwise would be hopelessly stained. Remember though that nothing will remedy the stains once they are dry at their edges. Paint will not even cover them. I have, in experiment, removed all the paint and repainted stains twenty times by actual count, and the stain came up as strong through the last coat of paint as it was before I touched the ground.

WATKINS GLEN

The natural scenery in the famous Watkins Glen in New York State has long been an object of curiosity and interest to innumerable visitors and it is natural that many of them today who carry cameras with them on their sight-seeing trips feel inclined to photograph the curious and diversified rock formations, the beautiful coloring, the numerous graceful waterfalls, and the other natural features which seem so beautiful. It is unfortunate that these beauties of color, especially, are not easily translatable into satisfactory negatives, for the rocks are dark, the gorges deep, and the light poor. The consequence is that the average visitor is much disappointed with his exposures, getting from his finisher, as a rule, only a bunch of very dark prints with an overaccented highlight here and there where the sun has fallen on the rocks or where the light of the sky shines through. The picture we reproduce above shows that the maker has been able to overcome many of these difficulties, for his exposure has been admirable and the print shows full detail everywhere, except in the remotest recesses of the ravine where we would naturally expect to find a few patches of deep shadow.

The composition of an attractive picture in this ravine is rather difficult, for the predominant lines are horizontal and it is difficult to make a harmonious composition from these broken and irregularly arranged strata. The present picture, however, shows lines which lead very nicely from the foreground over the waterfall, up the staircase, to a natural exit in the distant patch of sky.

This was made with an Ansco equipped with an Ilex *f*:7.5 lens of 6¾ inches focus and an Ilex Acme shutter. The exposure at 9.45 A. M. in July was 1-25 second at *f*:7.5, the make of film not being mentioned.

SKY FILTERS

A sky filter is very useful to the man who is not in a position to make an orthochromatic exposure. These filters grade down from a deep orange at the top to perfect transparency at the bottom. The

AFTER THE HARVEST — A. W. CRAWFORD

sky and clouds are much more actinic than the foreground, and they would be grossly overexposed if given an exposure long enough to give good shadow detail in a heavy foreground. The graded filter often will equalize the exposure and give a very excellent negative. It cannot be used if any important foreground object, a tree for example, projects into the sky, otherwise part of the tree or whatever it is would be badly underexposed, but on an open landscape where the upper part of the picture is nothing but the unobstructed sky a filter of this description often is of great assistance in equalizing the exposure.

AFTER THE HARVEST

It seems hard to understand how it was possible for photographers to put up with the faulty tone rendering of the old color-blind emulsion for so long after a remedy for this had been discovered. The use of orthochromatic plates and color filters for landscape pictures was thought to be quite unnecessary by many of the old workers, because a clear, white-paper sky had become so familiar that it was regarded by many as being correct. The moods of nature depend very much for their representation on suitable rendering of sky tones; a perfectly blank, white sky does not suggest sunlight as convincingly as a sky in which we see white cumulus clouds distinctly differentiated in tone from the blue of the sky between them. The sky can be luminous without being white, and a serious landscape worker at the present time would seldom attempt to make exposures except through a ray-filter.

It is the sky that makes Mr. Crawford's picture, "After the Harvest," so attractive. The tones throughout are so well rendered that they strongly suggest the actual colors of nature. The composition is simple but very pleasing, and the picture, though unambitious, is entirely successful. Made with a Conley camera, 4 x 5, R. R. lens of 6¼ inches' focal length, used at *f*:11, good light at 11 A. M. in October, three-times filter, exposure one-fifth second, Hammer Ortho plate, developed with metol-hydrochinon, print on Normal Cyko.

A FEW RULES I HAVE FOUND GOOD TO FOLLOW

Making Sittings of Children. Use plenty of light: do not be afraid of using too much, for the more you use the better the negatives will be. Bear in mind that more light means greater softness and roundness. The light should fall from the front, both side and top. Children's faces do not show any character, so that the light may be as strong as wanted without destroying the likeness. Another great advantage in using a large source of light is, of course, to be had in making the sittings quickly. I make all children's pictures in snapshot work. This may seem bad policy to the one who believes in the long exposures, but, as stated above, I have not found that it destroys any of the character, and inasmuch as I get a fully timed negative by using a large source of light, the negatives show plenty of strength. Also, I use, as a rule, light grounds for children's pictures. I have always associated the lives of the little ones with light and sunshine. Make their pictures show it. A child is all out of place when shown in a picture as though he were sitting in a dark room. Children do not like night or dark rooms, but they do like sunshine and plenty of it. It is their nature, and why not show them that way?

Old People. Of all the subjects that come to the studio, I would rather photograph the old folks than any. Every face means something, and every line in the face means some trial overcome, some story that we all could profit by if it were not for the fact that we all have to learn by actual experience. For such subjects I use the light from a lower source, working it more from the side and rather farther to the rear of the subject than usual. Do not try to

fill every line and wrinkle with light, thinking it will better the picture. It makes it weak in character. A better plan is to use the lens open — that is, without a diaphragm — and focus well up on the end of the nose, so that the face may be in a soft, delicate diffusion. Far be it from my intention to recommend the fuzzy, woolly type stuff that is often seen, but a soft, diffused focus gives to the old face the softness of age without destroying character and without exaggerating the lines, as is often done, both intentionally and unintentionally. Some operators seem to think character expresses more than delicate handling of the lines.

White Draperies. Pose the subject close up to the light and use a very small opening; in fact, some of the very best things I ever made were by an opening no larger than a window. This allows the operator to concentrate the light directly on the face of his subject, and the drapery is thrown down in a lower tone by reason of the light being too small to spread all over the entire figure in even strength. Also, the figure should be turned a trifle from the light if perfect detail is to be secured. By having the figure turned from the light it throws the front of the figure in shadow, and the shadow, of course, holds back the details and thus prevents the drapery from developing ahead of the face to such an extent that the detail would be lost in it.

Dark Draperies. Use light falling from the front, and have the top light a little in excess of the side light and the figure facing more to the light. Better detail is the result and less screening is needed. Be sure to time for the deepest shadow in the drapery if it is to show the detail. One cannot get the detail if the exposure has been too short. The face must be toned down so that there is an even blending of the lights into the shadows, for if this is not done the lighting will be harsh, and the face will stand out like marble while the drapery will look more like a charcoal drawing.

Hollow Eyes. The light must fall from the front and low down. This means that the operator must use his light low enough on the side so that it can get into the eyes. Bear in mind that light does not bend out of its course, and if it is falling from above the subject it cannot bend out past the brow and then turn back again to get into the eyes. The operator must so arrange his curtains that the light is directed into the eyes, and it will be found that when this is done it will be from a lower point than he is in the habit of working the light. The little catchlight that should appear in the eyes can only be gotten by the use of a light that is low enough to fall across the nose just at its root, so that really the light passes between the two eyebrows, over the top of the one on the light side and under the one on the shadow side, and thence into the shadow eye, and the catchlight is the result.

Long Neck. Turn the subject's body a trifle from the light and the face back to the light and lower his head. By so doing the chin comes down toward the shoulder nearer to the camera and the line of the neck is visibly shortened. At the same time the camera should be raised above the subject's nose, so that it really looks down on the chin.

Long Nose. Raise the subject's head and lower the camera, so that it comes under the nose and allows the nostrils to show from the lens.

Short Nose. Raise the camera and lower the subject's head, so that the nostrils can barely be seen.

Long Face. Use front light and rather diffused. Make a three-quarter view of his face, unless he has a hollow cheek, when it is a good plan to allow the ear to just fill the hollow of the cheek on the shadow side of the face.

Short Neck and Round Face. Have the subject stand, even though a bust negative is to be made. This allows the shoulders to fall lower and the weight of the body is pulled downward, so that all features and members are elongated. Make almost a profile and use very strong light from the side and no reflected light on the shadow side of the face. Remember that contrast gives a lengthening effect to a round face. One reason the moon is said to be full is because there is no shadow on it, and the result is that it is perfectly round. The same is true of the one with a short neck and round face.

Bride and Groom. The bride should be posed on the light side of the picture — that is, on the side next the light. This is done so that a small opaque screen can be brought close up to her and screen down the drapery, so as to show the detail in the whites. At the same time, the groom being farther from the screen than the bride, the light falls over the top of it on his black clothes and thus gets the detail in the blacks.

Hands. Be careful to allow just a trifle of the cuff to show in the man's picture, for it makes the hands appear smaller than anything else can do. Also, as a rule, the hands should be posed somewhat to the side, so as to appear smaller, and should not be placed directly under the face nor in line with the face. They should be screened somewhat, so as not to be lighter than the face.

Blondes. Use a low key of light, so as to get all of the strength possible. As a rule, the blonde appears to be lacking in strength in the picture unless so handled. Some shadow effect is good, but do not make the mistake of making a contrast lighting, thinking it is a very low key. A low-keyed lighting should have just as much softness as the high key. Soft, delicate detail should be seen all through the entire lighting.

Brunettes. A higher key of light, and the face so toned down that it is brought in closer touch with the hair. The hair, being black, will lack detail if the face is not toned down so that the exposure can be given long enough to get the details in the hair.

Glossy Flesh. Where the flesh is moist it makes the high-lights stand up too strong, and the result is a harsh lighting. If a powder puff is passed lightly over them with just a suspicion of powder on it, it will kill the gloss and the lighting will be more even and show better detail in the highlights.

Dry Flesh. Sometimes the flesh is so dry and uniform in tone that the results shows the face to be flat, with no half-tones. If the operator will have handy a small vial of oil, which has been scented up with lavender water, and just touch his finger to the mouth of the bottle, getting the smallest bit of oil on it, and then touch the flesh where the highlights should appear, he will get much better roundness. Too much oil will give a harsh effect. The lavender water is to make the oil have a better scent.

Staring Eyes. Light the subject in a very low key of light, so that an exposure of several seconds has to be given and then have the subject wink the eyes several times while the exposure is being made. The winking of the eyes does away with the stare.

Sleepy Eyes. Have the subject lighted in a low key of light, so that several seconds' exposure has to be given, and then have him look directly at the center of a large black background or black cloth.

THOUGHTS OF THANKSGIVING — EDWIN A. ROBERTS

The eyes will expand somewhat and the expression is much better and more animated.

Crooked Nose. Show the side of the face that has the hump of the nose. Do not photograph into the hollow of the nose, as that makes it appear worse. Use broad lighting, falling from the top and front, making the shadows fall more downward.

Mouth That is Lower at One Corner Than the Other. Pose the subject so that the head may be tilted toward the side that is higher. This lowers the corner that is higher and raises the lower corner, and the mouth is made to appear straight. By "tilting" the head I do not mean to *turn* the head, as that is quite different. I mean to tilt the top of the head to one shoulder or the other, whichever is needed.

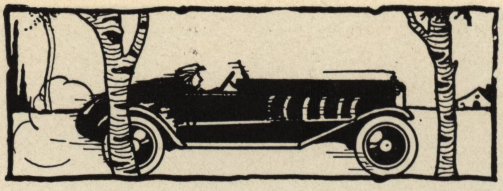
High Cheek Bones. Use front light, from top and side, and make a front view of the face. The light should be soft and the shadows full of detail. — FELIX RAYMER, in *Trade News.*

CHROME ALUM FIXING BATH FOR COLOR SENSITIVE PLATES

Chrome alum fixing baths have advantages that are rarely mentioned in connection with very rapid plates or color sensitive plates. One of these advantages is that the solution is green in color and is almost opaque in thick layers. This permits of the darkroom light being turned up as soon as the plates are under the surface of the fixing bath. With this bath, as with others, there is a limit to the time that it should be used. When a hypo bath has fixed a lot of plates, it becomes loaded with silver and, while it may still render the film transparent, it does not always follow that the silver compounds in the film will wash out readily.

THOUGHTS OF THANKSGIVING

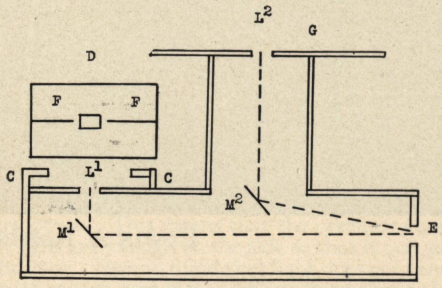
This is surely a fine specimen of the noble bird and is an excellent photograph except that the print is just a trifle flat and lacking in contrast. Possibly a harder grade of paper would yield a snappier print. The bird is well placed in the picture space and the simple background helps very much in making the picture successful. Made with an Ica camera, 6½ x 9 cm Hekla lens of 3½ inches' focal length, used at *f*:6.8, bright light at 3 P. M. in November, exposure one-twenty-fifth second, Hammer Ortho Extra Fast Plate, Thermo pyro developer, enlarged on P. M. C. No. 7.



THE PHOTOGRAPHIC REVIEW

E. J. WALL, F. C. S., F. R. P. S.

A SIMPLE PHOTOMETER — H. Naumann describes the following very simple photometer for measuring densities or matching filters, which can obviously be made of wood at very low cost. The only expensive item is the neutral wedge. As the drawing is practically to scale anyone can measure up and obtain the necessary dimensions. The important point is that the distance EM^1L^1 must be equal to EM^2L^2, and this should be the distance of distinct vision, namely 10 inches. M^1 and M^2 are mirrors, the former being at an angle of 45° to the line M^1E, whilst M^2 is approximately at 50° degrees. The exact angle of this latter can be easily found by trial and error, as it should reflect the aperture L^2 side by side with and contiguous to L^1. The neutral wedge is laid on the top of the little table over the aperture L^1, and should slide easily under the arms



CC. The top of this table is shown in *D*, with the aperture L^1 and the two lines *F F*, exactly cutting the center of the aperture. These lines enable one to read accurately the density marked on the edge of the wedge. The negative to be read is placed on the larger table *G*, which should be preferably provided with a pair of weak springs to hold the negative in place (*Zeits. wiss. Phot.*, 1922, **21**, 113). There are doubtless many who would like to do a little sensitometry but are deterred by the cost of the apparatus, and this little photometer should be of considerable assistance. There are one or two improvements or suggestions that occur to one. It would probably be more convenient to place M^2 on the same line as M^1 and parallel to it, that is at an angle of 45 degrees, and remove the silver from a small patch in the center which would enable one to see M^1 through the same. One would thus have perfectly contiguous fields. The shape of the patch to be removed is immaterial; it can be either circular or rectangular, but it should not be too large, otherwise one would see the whole of the other mirror or beyond it. The apertures L^1L^2 need be only about 3 mm broad and 6 mm long. It would be far preferable, and much more accurate readings could be obtained, if both the apertures in the tables had pieces of opal glass, matt on one side, fitting over the wedge and the negative, and the latter must have its gelatine film in contact with the polished face of the opal. The opal glasses could be arranged so as to be carried by small spring frames, so as not to shift when the wedge or negative were moved. This would obviate the scatter of the light by the silver of the negative, which always causes errors in photometric readings. Better results would also be obtained if the mirrors were silvered on their surfaces, although this is not absolutely essential. The neutral wedges, properly calibrated, can be obtained from the Kodak Research Laboratory, and one with a rather high constant should be obtained. The center "wedge constant" is the logarithm of the density per centimeter. Naumann used one with a constant of 0.58, but one with a range from zero to 4.0 would be ample, for one never wants to or can read above a density of about 3.5. Naumann suggests as a recommendation for this instrument that it can be used with one light source, but personally I should prefer to use two ground glass Mazda lamps in series, as this would enable one to obtain equalization of the two photometer fields before starting to read, by slightly shifting the distance of one or other of the lamps, and this is essential for accurate work. The neutral wedges can be obtained in various sizes, ranging from 10 to 20 cm in length. The longer the wedge the easier it becomes to estimate the density at any point. Naturally the densities of the wedge should be written on one edge, so as to make it easy to read that which is opposite the lines *F F*. The eyehole *E* should not be large; a 2 mm circular aperture is quite large enough; with a larger hole there is a chance of not getting the eye central and then there is a chance of false readings.

WASHING PRINTS AND NEGATIVES — Like everything else, water is taxed pretty heavily in Germany at the present time, and "H" calls attention to the economy that may be effected in washing. If running water be used with a consumption of 450 liters per hour (118 gallons) there is still considerable hypo left in the prints at the end of an hour and even with two hours washing, although hypo could not be detected in the wash water, there were still measurable quantities in the paper fibers. If washing is effected in dishes, there are two methods that may be adopted, one in which the water is frequently emptied away and the dish filled up, and the other in which the prints are squeegeed between filter papers or blotting boards at each change. Allowing 100 ccm. to every 234 qcm (3½ ozs to 36½ sq. ins.) and changing the water every five minutes, the following table shows the quantities of hypo in the prints by the two methods:

Water change	Not squeegeed	Squeegeed
1	0.558 g	0.440
2	0.049	0.022
3	0.007	0.004
4	0.002	0.0019
5	0.001	0.0007
6	0.0006	0.0006
7	0.0003	0.0003
8	0.00016	0.00016

From this it is obvious that with seven changes of water the hypo residue is the same and the total consumption of water is 700 ccm (approx. 24 oz.). It is assumed that the prints are kept in motion all the time and not allowed to stick to one another. With plates of the same area, and allowing 500 ccm (17½ oz.) per change, five changes will be enough to reduce the quantity of hypo to 0.0005 g, which is

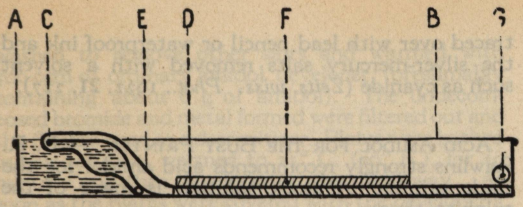


Fig. 1

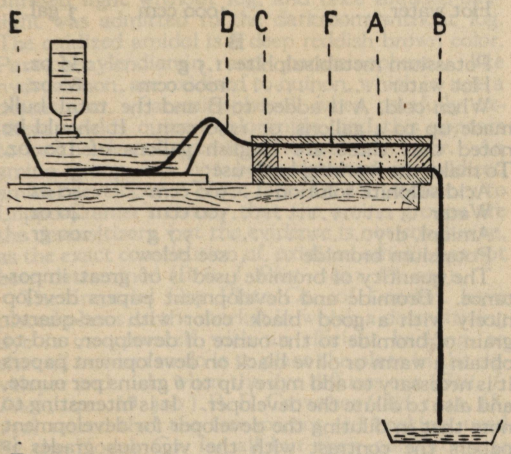


Fig. 3

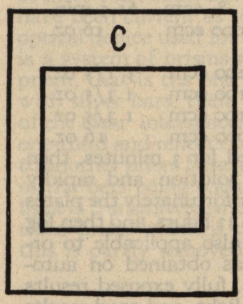


Fig. 4

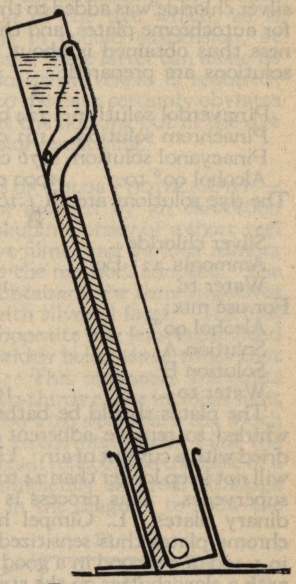


Fig. 2

harmless, entailing a total consumption of 2,500 ccm (8½ gallons) (*Phot. Chron.*, 1922, **29**, 72). Although not credited to them (and the Editor says he pays for all these contributions), this investigation was carried out by Lumière & Seyewetz (*Bull. Soc. franç. Phot.*, 1902, **43**, 259).

RAPID WASHING OF PLATES AND PRECIPITATES.— L. Lumière suggests the following distinctly novel and effective method of washing plates and precipitates by capillary attraction, diffusion and displacement, which should be of considerable interest to those who have to pay water bills. It is a well-known fact that a woven cloth acts as a syphon if hung over the edge of a basin, due to the capillary attraction in the interstices of the fibers. The nature of the fibers, the closeness of the weave and the viscosity and surface tension of the liquid naturally play an important part in the rapidity of the flow; but with both paper and cloth it is practically constant for a given height of fall, which with cloth is about 18 cm. Lumière suggests a metal dish made as shown in Fig. 1, in which *A* is the dish turned up at one end to form a cover *B*, practically a little reservoir. At the *A* end is also a reservoir formed by the curved piece *C*. On the bottom of the dish is placed a sheet of glass *D*, over which is placed the cloth E, which must be long enough to reach to the bottom of the two reservoirs, and *G* is a waste pipe.

The *A* reservoir is filled with water and a thin layer of water placed in the dish over the glass and cloth so as to avoid air bubbles. Then the plate to be washed, *F*, is placed film down on the cloth and the dish raised to an almost vertical direction as in Fig. 2. In this way the water siphons down the cloth and a 9 x 12 cm plate (3¼ x 4¾ in.) was thoroughly washed in from 12 to 15 minutes with a total consumption of water of 30 ccm (practically 1 oz.). For washing precipitates a slightly different arrangement is to be adopted. Fig. 3, *A* is a sheet of glass, which is covered with a sheet of wet cloth *B*, long enough to hang down at one end. On the cloth is placed a little cell or frame of glass, hard rubber or porcelain, of from 5 to 10 mm thickness, Fig. 4. The precipitate is packed into this frame and over the top is laid another piece of cloth *D*, one end of which dips into the dish E, while the other end stops short at the edge of the little frame. A sheet of glass, ground on the lower face, is placed on top of this piece of cloth. The inverted or Mariotte's bottle is placed about 1 cm above the edge of the dish *E* and it should be 2 to 3 cm above the top of the small frame. The precipitate is thus enclosed in a cell from which the water is constantly withdrawn by the cloth *B*, fresh being supplied by the cloth *D*. A precipitate will be practically sufficiently washed when about twice the volume of the cell in water is collected in the outflow dish. It is only necessary to remove the glass *F* and the cloth *D* and to leave the cell for a short time, and the precipitate can be collected as a paste. With a cell 5 x 5 cm and 1 cm in depth, thus containing 25 ccm of precipitate, the latter was completely washed in 1½ hours with a total consumption of water of 50 ccm. This last device is also applicable to the extraction of a soluble substance, from an insoluble admixture, with a suitable solvent (*Rev. Franç. Phot.*, 1922, **3**, 109).

HYPERSENSITIZING AUTOCHROME AND OTHER PLATES. — A sealed envelope deposited with the Société Française de Photographie in 1913, was recently opened and the contents made public. The fundamental idea of the new process is that in the

majority of orthochromatizing baths the addition of ammonia is necessary and that the action of this is to dissolve a very minute quantity of the silver halide, which combines with the dye. Based on this a method was evolved in which a small quantity of silver chloride was added to the hypersensitizing bath for autochrome plates, and the increase in sensitiveness thus obtained is about 30 times. Two stock solutions are prepared:

A

Pinaverdol solution	324 ccm	5 oz. 88 min.
Pinachrom solution	162 ccm	2 oz. 284 min.
Pinacyanol solution	76 ccm	1 oz. 104 min.
Alcohol 90° to	1000 ccm	16 oz.

The dye solutions are all 1:2000 in alcohol 90°.

B

Silver chloride	2 g	15.36 gr.
Ammonia 22° Be.	8 ccm	61.5 min.
Water to	1000 ccm	16 oz.

For use mix:

Alcohol 90°	200 ccm	3 1/5 oz.
Solution A	100 ccm	1 3/5 oz.
Solution B	100 ccm	1 3/5 oz.
Water to	1000 ccm	16 oz.

The plates should be bathed for 3 minutes, then whirled to remove adherent solution and rapidly dried with a current of air. Unfortunately the plates will not keep longer than 24 to 32 hours, and then fog supervenes. This process is also applicable to ordinary plates. L. Gimpel has obtained on autochrome plates thus sensitized, fully exposed results in 1-100 of a second in a good light, and good results with a slow shutter on the stage with ordinary stage lighting. During the discussion on this paper A. Richard stated that the acetates, especially ammonium acetate, stabilized panchromatic and hypersensitized plates (*Bull. Soc. franç. Phot.*, 1922, **64**, 90; *Rev. Franç, Phot.*, 1922 **3**, 90). That the solvent action of ammonia comes into play is probably correct as the cause of the increased sensitiveness; but it is not the cause of color-sensitizing, as plain aqueous dye baths will color-sensitize. Hyslop (*Brit. J. Phot.*, 1887, **34**, 88) used silver chloride dissolved in ammonia in conjunction with erythrosin, and the use of silver nitrate with ammonia and dyes was published quite early by Mallmann and Scolik, Waterhouse, etc. A plain ammoniacal solution of silver nitrate as a bath for increasing sensitiveness was suggested by Stocsh (*Phot. Mitt.*, 1881, **18**, 70). For those who may wish to try this process, the simplest way will be to dissolve 23.7 g silver nitrate in 100 ccm distilled water and add enough hydrochloric acid to precipitate the chloride, well wash with water till the washings are no longer acid and then dissolve in ammonia. This gives 20 g silver chloride. This must be prepared in the darkroom.

THE PHOTOGRAPHIC REPRODUCTION OF WATERMARKS.—O. Mente and F. Franke propose the following method of obtaining reproductions of watermarks on paper, whether written or printed on one or both sides. A sheet of development paper is exposed to white light, developed and fixed, and after well washing bleached in mercuric chloride, washed and dried in the dark. A piece of unglazed procelain is now soaked in ammonia solution and one surface wiped free from solution. The paper bearing the water mark is placed in contact with the bleached development paper and on top of this the ammonia-soaked porcelain slab. The fumes of ammonia penetrate the watermark before the rest of the paper, because the mark is thinner, and thus blacken the mercury-bleached film. The image can then be traced over with lead pencil or waterproof ink and the silver-mercury salts removed with a solvent such as cyanide (*Zeits. wiss. Phot.*, 1922, **21**, 227).

ACID AMIDOL FOR THE BUSY PRINTER. — B. R. Rawlins strongly recommends acid amidol for the trade printer. A stock solution is made of the sulphite thus:

A

Sodium sulphite, dry	40 g	4 lb.
Hot water	1000 ccm	3 gal.

B

Potassium metabisulphite	1.5 g	2½ oz.
Hot water	1000 ccm	80 oz.

When cold, A is added to B and the total bulk made up to 4 gallons, or 1250 ccm. It should be noted that these are English gallons of 160 oz. To make the working bath use:

Acid sulphite solution	500 ccm	40 oz.
Water	500 ccm	40 oz.
Amidol, dry	5.7 g	200 gr.
Potassium bromide	see below	

The quantity of bromide used is of great importance. Bromide and development papers develop nicely with a good black color with one-quarter grain of bromide to the ounce of developer, and to obtain a warm or olive black on development papers it is necessary to add more, up to 6 grains per ounce, and also to dilute the developer. It is interesting to note that in diluting the developer for development papers the contrast with the vigorous grades is increased, but quite the reverse happens when using a diluted developer for bromides. Potassium bromide has little or no influence on the contrast given by any particular paper, but it is in practice necessary to prevent fog and to control the color of the image. Absence of bromide will give quite a blue color on gaslight papers, but the whites will often be degraded. The following table may be useful when a particular color is desired:

Process	Grade	Exposure	Grains pot. brom. per oz.	Color
Development	Vigorous	Correct	¼	Pure black
"	Normal	Double Normal	1	Olive black
"	Soft	4 times normal	4	Brown black
Bromide	All	Correct	¼	Pure black
Bromide	All	Normal plus 1-3	1	Greenish black

The latter color is produced on bromides that are to be toned in the hypo-alum bath. The development is stopped short of finality, so as to ensure a warm sepia tone in this toning bath. Bromides developed to finality give a rather cold tone in hypo-alum. It is convenient to make up a large fixing-bath for a busy man. A good formula is:

Hypo	18 lbs.
Hot water	34 qts.

When cool, add the following solution:

Potassium metabisulphite	5 oz.
Hot water	2 qt.

These are English quarts of 40 oz. (*Brit. J. Phot.*, 1922, **69**, 293).

DESENSITIZING WITH SPENT DEVELOPERS. — J. G. F. Druce has been examining the action of spent or oxidized developers as desensitizing agents, as suggested by Lüppo-Cramer, and finds that oxidized amidol will act as a desensitizer. To make quite certain that amidol was completely oxidized, 6 g of freshly precipitated silver bromide was well

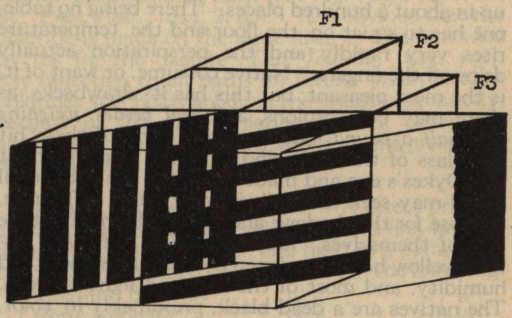
washed to remove other salts and warmed with 500 ccm of ordinary amidol developer (presumably containing about 6 g of amidol). The undecomposed bromide and metal formed were filtered out and the filtrate used as a desensitizer. Plates were bathed in this solution, warmed to 21° C. (70° F.), for 10 minutes and then developed in the usual way. As soon as the plates were covered with the developer a bright yellow light was turned on, instead of the red, and the plates could be occasionally held up to the diffused light without fog, and once diffused daylight was admitted to the darkroom without fog. The oxidized amidol is a deep reddish brown color. Para-phenylendiamin and paraminophenol, like hydrochinon, are oxidized to quinon, which is not a desensitizer. Paraminophenol, when carefully oxidized, yields quinon chlorimide, and this appears to be the desensitizer in a normal developer. An amino group has not been detected in oxidized amidol developer. These facts are contradictory to Lüppo-Cramer's theory that the amino groups are the desensitizers, but the evidence is not conclusive, as the exact constitution of oxidized amidol has not been determined (*Brit. J. Phot.*, 1922, **69**, 296).

The Imperial Dry Plate Co., of London, have placed plates on the market in which a desensitizing dye is incorporated with an efficient backing, so that all one has to do is to place the plate in the developer and rock, when the dye diffuses out (*Brit. J. Phot.*, 1922, **69**, 300). R. E. Crowther (*ibid*, 1921, **68**, 232) stated that the transparent red backing, used by the Kodak Co. for all but their panchromatic plates, was a very strong desensitizer.

The Keeping Power of Panchromatic Plates. — E. Stenger reports on 14 different plates panchromatized by addition of the dye to the emulsion, and 10 sensitized by bathing, all of which had been kept from 12 to 19 years. Of the former 8, or 57 per cent, were still usable; 5, or 36 per cent, impossible, and 1 doubtful. One particular make of plate which in 1906 showed a fog of 0.55 now showed a fog of 0.88. When freshly made, the blue sensitiveness was far in excess of that for the orange-red, and this was less than that for yellow-green. In the old plates the orange-red sensitiveness, wave-length 580, was greater than that for the yellow-green at 530, and approximately the same as for the blue. Of the bathed plates, which were originally prepared between 1903 and 1909 by Stenger, 6 were bathed with isocol. 3 with ethyl red and 1 with pinachrom, an ammoniacal bath being used. All these plates were hopelessly fogged and useless.

Stenger has also made experiments, using ethyl red as sensitizer, to see whether the addition of bromide to the sensitizing bath would keep down the fog. He used a bath containing 33 per cent of alcohol with geometrically increasing ratios of bromide from 0.01 to 0.12 per cent, and while there was a lessening of fog there was also lessening of the color-sensitiveness. The plates were kept 24, 71 and 116 hours at 55° to 60° C. (131°-140° F.) and in all cases there was marked increase of fog and reduction of color-sensitiveness with increase of time (*Zeits. wiss. Phot.*, 1922, **21**, 246). Stenger's idea of using such high temperatures is to shorten the time of the observation, on the assumption that this increase in heat is equivalent to long keeping at lower temperatures, because no one ever keeps plates at such temperatures in practice. A long series of experiments were carried out by the writer in 1917 as to the action of various additions as fog preventers with bathed plates, but in every case when fog was reduced there was also reduction of color-sensitiveness. There is also another point which Stenger does not allude to and that is that the addition of any salt or electrolyte to the sensitizing bath causes very rapid precipitation of the dye which, as is probably well-known, is in colloid suspension, at least in aqueous baths, and these latter can alone be used if the highest color-sensitiveness is required; the addition of alcohol to the bath certainly obviates or delays to some extent the flocking out of the dye but at the expense of color-sensitizing.

The Gorsky Process of Color Photography.— Some interest has been aroused by an exhibition given in London by Prokudin-Gorsky of a short reel of three-color subtractive films, and various rumors have been current as to the methods adopted. The optical device used for obtaining the three negatives is a system of prisms with silvered faces. The first prism, that is the one opposite the lens, is provided with silver bars, their width being three times that of the clear interspaces. This obviously transmits one-third and reflects two-thirds of the incident light to another prism base also with silver bars, the width of the bars being equal to the interspaces. Half the light is transmitted and half reflected to the base of a third prism which is completely silvered, although this is partly removed in the diagram to show the



other bars. Three separate films are used in staggered formation at *f*:1, *f*:2, *f*:3, so that the optical paths are equal (*Conquest*, 1922, **3**, 52). Precisely the same form of prisms and silvering was patented by W. H. Kunz (*U. S. Patent*, 1,320,625, 1919). No definite information is to hand as to the method of printing adopted by Gorsky; but in *Eng. Patent* 168,100, 1920, a process is claimed in which the minus-yellow image is first obtained, then iodized and treated with auramin; the film is then to be recoated and the minus-red image obtained and treated with rhodamin, again recoated and the minus-blue image obtained by cyanotype toning. This is a costly and very troublesome method, and it is possible to obtain three superimposed images by a much cheaper and easier method.

A New Orthochromatizing Dye. — W. H. Mills and Sir. Wm. Pope announce the discovery of a new color-sensitizer, 2-para-dimethylaminostyryl-pyridine methiodide, which is prepared in a very simple manner, of which full working details are given. The new dye is readily decolorized by mineral acids, but less readily than the isocyanins, and it is the simplest member of a novel series of compounds which may be expected to act as sensitizers. Plates bathed in an aqueous solution,

1:40,000 to 50,000, show almost uniform sensitiveness from the blue to wave-length 560 in the yellow with a very rapid drop until it ends at 620 in the orange and without that marked gap in the blue-green so characteristic of the eosin group, which up to the present have been universally used for making ortho plates. The authors point out that König (*J. prakt. Chem.*, 1912, ii, **86**, 172) has stated that coloring matters apparently analagous to the isocyanins could be prepared from para-dimethylaminobenzaldehyde and piperidine, and that Barbier (*Bull. Soc. Chim.*, 1921, IV, **27**, 427) had described the preparation of such a dye. Further that König and Treichel (*J. prakt. Chem.*, 1921, ii, **102**, 63) also described the same; but no indication has been given of any sensitizing action (*J. C. S.*, 1922, **121**, 946). It is obvious that this new green sensitizer, for which it is to be hoped some shorter name will be coined, bears a very close resemblance in action to pinaflavol, recently introduced by the Hoechst works (*This Journal*, 1922, 119) and will be a welcome addition to practical aids.

PHOTOGRAPHY IN TROPICAL WEST AFRICA. — R. Dykes strongly recommends all photographers to carry a small portable dark room, suitable for changing sensitive material and developing test exposures. Even on the darkest of nights in a forest vivid flashes of lightning take place and no native hut is light or rain tight, consequently holes have to be stuffed up in about a hundred places. There being no table, one has to squat on the floor and the temperature rises very rapidly and the perspiration actually drips off the fingers. Native costume, or want of it, is the most pleasant; but this has its drawbacks, as there may be scorpions, and *real beetles, weighing over half a pound*, buzz around. One of these hit the glass of the lamp and smashed it, another hit Dr. Dykes's eye and made it black. An occasional lizard may seek its food up your back. The rule, "expose for the shadows and let the highlights take care of themselves," is still sound. There is a distinct yellow haze occasioned by the intense heat and humidity, and most of the reflected light is green. The natives are a dead black, presumably in color, and the soil ranges in color from yellow through reds to umber. The best time to photograph is either early in the morning or late in the afternoon. If midday work is attempted an umbrella should be used to protect the camera, or it may get so hot as to be unbearable to the touch. Development in the tropics is not advisable, except for tests. All exposed plates and films should be packed in oilskin envelopes and in boxes with calcium chloride. If one can control the temperature in developing, the hypo bath usually melts the film. Drying is another difficulty, as the film may melt, or ants and other small deer dine off the gelatine. A small pocket camera is strongly advised, as wonderful shots can be obtained while traveling without unlimbering larger apparatus (*Brit. J. Phot.*, 1922, **69**, 310).

THE "OSGLIM" NEON DISCHARGE LAMP. — This is a new and interesting incandescent lamp introduced in England by the General Electric Co., and was dealt with by Messrs. Ryde and Storr recently before the R. P. S. Until recently it has been impossible to make an efficient lamp of less than about 10 candle-power, which would run on the ordinary house supply, because for a given efficiency the c. p. of a metal filament lamp is proportional to the two-thirds power of the filament diameter times the voltage. So that with given voltage, and efficiency, the c. p. can only be reduced by reducing the diameter of the filament, and there are difficulties in drawing very fine tungsten wires. In the new lamp the luminosity of the electric discharge through rarified gases is taken advantage of. Neon with about 20 per cent of helium is used. The advantage of neon is that most of the energy lies in the red and yellow regions of the spectrum, with practically none in the ultra-violet and infra-red; this latter fact meaning, of course, less heating of the lamp. Also the starting voltage is lower. The lamps are filled to about 10 mm of mercury, with the electrodes only a few milimeters apart, and thus the discharge starts at about 160 volts. The nearness of the electrodes also causes more negative glow, which appears as a layer of bright yellow luminosity about 2 mm thick, and of the form of the cathode. For illumination the cathode takes the form of a double star, the anode being a short iron rod behind the cathode. Due to the absence of fragile filaments, the lamps stand up well and except for the fact that after a long period of burning the bulb blackens, would have an indefinte life. This blackening is due to the spattering of the glass by particles of the metal cathode. The rate at which the blackening takes place is dependent on the current and the metal used. With pure iron and the addition of some impurities in the neon, a life of from 1000 to 2000 hours is possible. These lamps may be run on direct or alternating current from voltages of 200 to 250. The power consumption is very small, being from 3 to 5 watts, depending on the size of the electrodes and voltage. This works out at about 2 cents per hour, power being reckoned at 12 cents per unit.

Mr. Storr dealt with the use of these lamps more from the photographic standpoint. As most of the light lies in the less refrangible end of the region, it is an easy matter to cut out the blue and violet by filters, but in actual tests it was found that it was impossible to get an equal efficiency, that is an equal safety for the same luminosity. It should be noted that this referred to the lighting of a dry plate factory, in which less illumination is permissible than in an ordinary darkroom. It was also pointed out that the spectrograph was not the most convenient method of testing a lamp, in consequence of the extremely long exposures required, and that color patches, of stained gelatine, were far more convenient and that they should be brought to the same luminosity (*Phot. J.*, 1922, **62**, 268).

PHOTOGRAPHIC RELIEFS. — R. John has patented "as an article of manufacture a base having on its surface great numbers of naturally photographically formed, extremely minute, individual protuberances insoluble in water, capable of taking up and delivering a liquid dye, which are distributed and grouped irregularly so as to represent photographic lights and shades." The sensitive surface is exposed through the support and developed with a metol-pyro solution containing only a small proportion of sulphite; the actual developer given being:

Pyrogallol	2.95 g	11 gr.
Metol	2.4 g	9 gr.
Potassium bromide	1.1 g	4 gr.
Sodium carbonate	54 g	200 gr.
Sodium sulphite	11 to 16 g	40 to 60 gr.
Water	1000 ccm.	8½ oz.

After development the plate or film is treated with water at about 38° C (98° F) and the gelatine not containing metallic silver is dissolved, leaving a relief. This is used as a carrier of a dye that can be

transferred to another gelatine surface, after removal of the metallic silver of the image by a solvent. For the three-color process tartrazin is suggested for the yellow, xylene red or crystal ponceau for the red, and patent blue for the blue (*U. S. Patent* 1,417,328, 1922). Exactly on what grounds this patent has been granted is not quite clear, unless it be for the individual protuberances photographically formed; but this is mere camouflage and describes a phenomenon that has been known for a long time. J. W. Swan (*Eng. Patent* 2,969, 1879) patented the formation of a relief from the hardening action of pyro which was to be used for photo-relief printing; but here there was no solution of the gelatine. Warnerke (*Eng. Patent* 1,436, 1881) patented the use of an actual washed out relief produced by the action of pyro without sulphite. Silbermann (*Reproduktionsverfahren*, 1907, **2**, 41) fully explained the action of the oxidation products of the developers and the relief-restraining effect of the sulphite, for he says: "It is well known that in the development of negatives there appears a more or less marked relief formation, which among other things depends upon the developer. Pyrogallol, eikonogen, hydrochinon and amidol give a strong relief; metol and diamidophenol a low one and glycin and rodinal practically none. . . That the insolubility of the gelatine is dependent on an oxidation process is also clear in that the presence of sulphite is prejudicial to the formation of the relief." R. E. Liesegang (*Phot. Archiv*, 1894, **35**, 273; 1896, **37**, 183) also commented on the relief with pyro; and Haddon and Grundy (*Brit. J. Phot.*, 1896, **43**, 356) proved that pyro solution had no tanning action on gelatine unless oxidized, and that when large proportions of sulphite are used in the developer the reducing agents are very little oxidized and the gelatine is left soluble and a very low relief is formed, and say: "An image in high relief is only formed under conditions which permit of the oxidation of the developer at the points at which it reduces the silver bromide, the gelatine at these points being tanned by the oxidation products." It will be seen, therefore, that this process is quite ancient.

THE FIRST PERFORATED FILM. — In a recent article on cinemotagraphy Regnault stated that he had not been able to find out who was the inventor of the perforated film. E. Coustet stated that he had found that the first mention of it was in a description of Reynaud's "théatre optique" in *Nouveautés photographiques* by Dillaye, published in 1894, p. 211 (*Rev. Sci.*, 1922, **60**, 202; *Tech. Ind. Phot.*, 1922, **2**, 60). It is possible to go even one better than Coustet, for C. P. Stirn of New York, in *U. S. Patent*, 418,343; *Eng. Patent* 6,886, 1889, patented a hand camera in which a sprocket wheel with 8 pins was used, which perforated the film and shifted it after each exposure. This was a hand camera and the pins perforated the film in the camera. Edison is usually credited with having used the first perforated film, and I believe collected royalties for many years on every foot of perforated film that was used. His patent was *U. S. Patent* 589,168, 1897, and he claimed: "An unbroken transparent or translucent tape-like photographic film, thereon equidistant photographs of successive positions of an object, all taken from the same point of view, such photographs being arranged in a continuous straight line sequence, unlimited in number save by the length of the film." This patent was for a camera as well, and the perforated film claim was re-issued separately as No. 12,192, 1904. The date of Edison's original application was Aug. 24, 1891, therefore three years before Dillaye's note. Le Prince in 1888 had used a perforated tape with sprocket wheels, but this was of metal.

GREEN AND OLIVE TONES. — R. Namias suggests the following method of making vanadium chloride for toning and the baths for green and olive tones.

Ammonium vanadate	100 g	770 gr.
Hydrochloric acid	250 ccm	4 oz.
Water	250 ccm	49 oz.

Sodium bisulphite, dry 60 to 80 g 46 to 61 gr.

Heat till the solution turns blue and dilute to 1000 ccm or 16 oz. The print should be bleached in a 2 to 5 per cent solution of potassium ferricyanide, washed and toned in:

Vanadium chloride, as above	25 ccm	192 minims
Ferric chloride	2.5 g	19 gr.
Ammonium chloride	100 g	768 gr.
Water	1000 ccm	16 oz.

More ferric chloride gives blue tones. This gives green tones. For olive the print is first toned in the ordinary uranium bath then treated with the following, after washing:

Ferric chloride	5 g	38½ gr.
Hydrochloric acid	10 ccm	77 min.
Water	1000 ccm	16 oz.

Both prints should be fixed in an acid hypo-sodium acetate fixing bath (*Il Prog. Foto.*, 1922, **29**, 85; *Phot. Abst.*, 1922, **2**, 80). It is obvious that the chloride is made on the same lines as recommended by me for the oxalate (*This Journal*, 1922, 396). My objection to all baths for toning which contain chlorides still holds good, as the images are muddy, because of the silver chloride formed; when the above bath is used for transparencies, the greens are distinctly olive in shade.

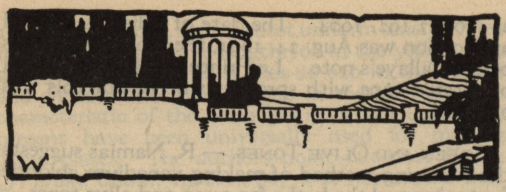
BROMOIL TRANSFER PROCESS — A direct print or enlargement should be developed with a non-tanning developer, such as amidol, and fixed in a plain hypo bath and well washed, then bleached in the following:

Potassium bromide	10 g	77 gr.
Cupric sulphate	15 g	115 gr.
Potassium bichromate	5 g	38½ gr.
Water	1000 ccm	6 oz.

Dissolve in the above order and add sufficient hydrochloric acid to form a clear solution. After complete bleaching, wash well and treat with a 1 per cent sulphuric acid bath to remove any yellow color. Again wash and fix in a 20 per cent solution of hypo and wash. Immerse the print for 10 minutes in:

Glycerine	333 ccm	5 oz.
Water	667 ccm	10 oz.

Place face up on a clean glass plate, and roll down with a roller squeegee. Now fasten the edges down to the glass with strips of gummed paper. Ink up with a roller with a greasy ink, litho or collotype. If the paper is too much hardened, the ink will take on the parts that should be white, and then it should be immersed again in the glycerine solution at a temperature of 30° C. (86°)F. or until the ground shows a distinct relief; then stick down again to the glass and ink up. It is stated that at least 100 pulls can be taken from this, and, of course, in any color, The process is also applicable to three-color work. (*Phot. Ind.*, 1922, 494). The use of this transfer process was first published almost simultaneously in England, France and Germany at the end of 1908 and has been repeatedly recommended since.



QUESTIONS & ANSWERS

PROCESS FOR MAKING PRINTS FROM DRAWINGS.— B. H., Dallas, Texas, — asks for a book describing the various ways of making blue prints from drawings, or any process, modernized, of making prints from drawings other than blue prints. "I desire to, principally, make prints from Patent Office drawings for office record and if possible produce lines other than regular blue print style." *Answer.* We think the instrument known as the Photostat would be the kind of thing you are looking for. This is the modern way of making prints from drawings, maps, plans, etc. other than blue prints. You could get prices and all details from the Commercial Camera Company, 343 State Street, Rochester, N. Y.

USING FILTER WITH SOFT FOCUS LENS. — G. J. B., Chicago, Ill., states — I have a 9 inch Struss lens for a 4 x 5 camera. What advantage would there be, if any, in using a cloud filter (sky filter) for clouds? Lens not being corrected (spherical or chromatic), wouldn't the half filter change the focus for one half of the plate? If so, that would mean that a sky filter cannot be used on this soft focus lens. What do you consider a good filter to use on this lens (2 inch diameter)? I thought of a K1 and K2, the first for short exposures and clouds and the latter for flowers and such like. I refer to the Wratten filters. *Answer.* A sky filter is not a satisfactory instrument to use because there are colors and tones in other parts of the picture that need correcting as well as in the sky and it seems rather foolish to correct half the picture and leave the other half alone. The use of a filter with a soft focus lens tends to sharpen up the definition a little, so that at full aperture the definition with the filter is about the same as the definition without any filter at a smaller opening. The use of the filter does away with some of the chromatic aberration in the lens. The K series are good filters to use, but they should be used, of course, with the Wratten plates for which they are adjusted. You will find the K1 is generally useful for outdoor work, clouds and landscapes, and the K2 for still-life and for such subjects as call for a fuller correction of tones.

MAKING A FOCUSING SCALE. — H. H. N., Minneapolis, Minn., writes — I should like to avail myself of the privilege of presenting a problem in camera construction to your readers, in the hope that it may be interesting in itself, as well as in the hope that I may find among them someone sufficiently skilled to help me out of a difficulty that has given me considerable annoyance. I have three cameras and only one lens, a Ross Anastigmat of 7.7 inches focus, or thereabouts, with an aperture of *f*:5.6. I bought three flanges for this lens, a somewhat expensive one, and fitted them myself to my three cameras, so that I use the same lens all the time, and this is a good enough arrangement in itself, but the difficulty that has arisen is that I have to go through the old fashioned process of putting a black cloth over my head and focusing the scene before I can take a picture. The results are all right but the process is un-American and obsolete, and if it were not that I have been an enthusiastic photographer for about twenty years, I would give up photography right now. I have tried this plan — I focused sharply a newspaper at 5 feet at *f*:5.6, using a tapeline to be sure of my distance and made a mark on the focusing scale, and *thought* that when the pointer was at this mark on all subsequent occasions, I was sure to have a perfectly good sharp focused picture, but development of the plate proved the falsity of this reasoning. Needless to say I repeated the process for 10, 15 and 25 feet, but the result makes me think that the matter of constructing a focusing scale is beset with some difficulty. Why should such an apparently simple thing be difficult?

Can you tell me the formula for discovering the exact length of the focus of a lens, for it may be that this is 7.9 inches instead of 7.7 inches, though that would not affect my way of settling the marks on the focusing scale. Another thing, if I could mark my focusing scale correctly, would the same marks be correct for *f*:5.6, *f*:8, *f*:11, *f*:16, etc.?

To pass to my second difficulty, my favorite camera is a Houghton's "Sanderson" which I purchased in London, England, when on a visit there some years ago. It is 3¼ x 4¼ inches, but is made for plates only. Is there anyone amongst your readers who has fitted a back to a plate camera for it to take roll film. You see my lens and shutter is too large to be fitted to the front of a Kodak and I cannot have it fitted by any of the shops. I should be glad to know the best way of constructing a back to take roll film, though it would be necessary for it to be in the nature of an extension as the bellows come right back to the frame of the glass focusing screen. *Answer.* In reply to yours of June 8th, we would say that we see nothing in the least bit un-American or obsolete in focusing on the ground glass when you have a good lens. All pictorial photographers do it, and it is the only way in which you can get the exact type of definition you desire, unless you are using a reflecting camera. Focusing with a scale would be entirely unsatisfactory for serious work with a high grade anastigmat lens.

As to making a focusing scale, this is a rather careful process and we would suggest that it would be advisable for you to use a focusing magnifier for this purpose. The usual way is to make a pencil mark on the ground glass and then cement a microscope cover glass over it with balsam. Then, by using a focusing magnifier, it is possible to get the aerial image in the plane of the penci mark and only in this way can you get accuracy enough to mark your focusing scale. There are twenty or more methods for measuring the focal length of a lens. One mathematically correct method is to fasten the camera firmly to a solid support, put a foot rule in front of the camera and adjust the focus so as to get the image on the ground glass exactly the same size as the object which, of course, requires a long bellows. Mark the position of the ground glass on the support. Then refocus on some object at least four or five hundred feet away and mark the position of the ground glass again. The difference between the two marks is the focal length of the lens, or one quarter the distance between the ground glass and the object in the first case is the focal length of the lens. There are today no devices for sale for

fitting roll films to plate cameras. Probably the easiest way would be to buy a cheap roll film camera, discard the front and bellows and fit it to the back of your plate camera. It would be a clumsy job at best and one which we would hardly recommend.

NAME OF LENS MAKER. — B. M., Memphis, Tenn., writes — From your great fund of general photographic knowledge perhaps you may be able to give me some information. I have a lens described as follows: Planastigmat — 20 inch focus — speed *f*:5.5 — 20 x 15. The original hood has been taken off and a special hood to hold filters substituted. The name of the maker may have been on the original hood. The Bausch and Lomb Optical Company have informed me that they do not know the lens, but that it is probably of foreign make. Do you know anything of this lens or its special characteristics? *Answer.* — In reply to yours of June 8 we would say that A. E. Staley & Company of London made an *f*:3 Planastigmat portrait lens which is a modified Petzval portrait lens with the lenses of the rear combination reversed, as was done by Dallmeyer. This is a two lens, four glass objective. O. Sichel of London made an eight lens Planastigmat similar in exterior appearance to the Goerz Dagor, but with the biconcave lenses replaced by two. Perhaps you will be able to determine which of these two lenses you have, if either.

BLUE GLASS FOR EXPOSURE METER. — A. D. M., Portland, Ore., writes—In your "Secret of Exposure" you say — "a blue glass dial is a great help in preventing the tendency to match color instead of darkness." Watkins in his manual also mentions a blue glass but in neither case is the shade or tint of the blue glass given. Will you kindly tell me how deep a blue glass is necessary for this dial. In the optical trade blue glasses are used and the shade or tint of blue is numbered so that all that is necessary is to order by number in prescribing blue glasses for wear. *Answer.* — The tint of blue glass necessary for an exposure meter is not very important, except that, naturally, it must be rather light in tone. It simply cuts out some of the yellow rays and gives a monochromatic effect.

FORMULA FOR GUM PRINTING. — C. P., Racine, Wis., asks for a reliable formula for gum printing and also where the materials for same can be bought. *Answer.* All you need for gum printing is some good paper that is well sized, gum arabic, a saturated solution of potassium bichromate and the pigment. A sizing mixture for the paper may be made by using a 3 to 5% solution of gelatine in water, adding 5 drops of formalin to the ounce. If the paper is already well sized, this need not be used. The gum solution is made by suspending 2 ounces of good, clean gum arabic in tears in a muslin bag in 6 ounces of water for about two days. The pigment may be ordinary moist water colors in tubes. A mixture may then be made of 10 parts gum solution, 5 parts bichromate solution and about half an inch or so of the color squeezed from the tube. Less bichromate will make the paper less sensitive. These must be thoroughly mixed by rubbing with a palette knife on a piece of glass. The paper is coated with this mixture with a camel hair mop, making it as smooth and as even as possible. The paper may then be dried and when dry it is sensitive to light. The image in printing is not visible and the time must be judged with an actinometer. As a general rule it takes about the same exposure in printing as a P. O. P. print to reach the right density. After printing place the exposed sheet face down in water, and the pigment will wash away in the parts not affected by the light. By increasing the temperature, by spraying, sponging or brushing the color may be removed more easily and this is where the personal control comes in. If another printing is required, the print when dry may be coated again and the process repeated. It must be registered in the printing frame as accurately as possible. There are so many variable factors, it is hard to give any hard and fast rules; each worker must gradually formulate his methods by careful experiment. A good book on this process is Pictorial Landscape Photography by the Photo Pictorialists of Buffalo. There is no other that is up to date. Zimmerman's method of Gum-Bichromate printing is published in the Photo-Miniature No. 113, now out of print.

ACTINOMETERS AND EXPOSURE METERS. — J. W. J., Hatboro, Pennsylvania, asks for information on actinometers and an instrument to measure the length of exposure of his camera to verify if the speeds as indicated on the shutter are correct. Any information along these lines will be appreciated. *Answer.* There are various actinometers on the market; the Watkins meters, the Wynne meter and others. They measure the strength of the light by the exposure of a piece of sensitive paper which is timed to match a tint on the face of the meter. This is, we think, the surest way of testing the strength of the light, especially for those who have not had much experience in judging such things. We do not think there is any instrument now on the market for measuring exposures, that is to say, for testing shutters, but in the issue of AMERICAN PHOTOGRAPHY for March, 1922, there was an article entitled — "Know your Camera Shutter," in which a simple and practical method of testing shutter speeds was described. The author used a phonograph for this purpose, but, as he points out, it is only necessary to photograph some object moving at a known rate of speed. A wheel revolving at a known rate would do as well as a phonograph record.

HISTORICAL PICTURES, — L. J. M., Mechanicsville, N. Y., writes — Do you know of any concern that would be in the market for a set of historical pictures with a short descriptive account? The history of this particular place dates back to treaties with the Indian Tribes and through the Revolutionary War. Any information which you may give will be greatly appreciated. *Answer.* We do not know of any concern that would be in the market for such pictures as you refer to. Possibly, by reading "Cash from your Camera" you might find someone who would be interested in them. This books tells where and how to sell pictures

USING CONVERTIBLE LENS. — M. D. A., Schuylkill Haven, Pa., writes — Would you be kind enough to answer a question regarding camera and lens for a new reader. Have long ago solved the camera weight problem for hunting and fishing. No. 3 Kodak with anastigmat lens, *f*:6.8, the smallest picture for satisfactory viewing without enlarging. Am going to purchase a plate camera, 3¼x5½, R.R., 13 inch bellows, with either series I or series IV, *f*:6.3 Velostigmat, 7 inch focus. Series IV is the non-convertible type. In the series I, convertible, front combination 17 inch focus, back combination

QUAIL IN DIXIE — H. C. BURGESS

11 inch focus, could the front combination of series I (17 inch focus) be used in 13 inch bellows with any material benefit photographically? What would be the shortest distance at which above could be used or any benefit derived from same? What is your opinion in regard to series IV for portrait, landscape and group photography in above mentioned camera? *Answer.* With only 13 inch bellows you could not use either the 17 inch or the 11 inch combination. When focused on "infinity" the lens would have to be, approximately, 17 or 11 inches away from the film and would need to be racked out still further in order to focus sharply on any objects nearer than "infinity," so you will see the 17 inch lens is out of the question and the 11 inch lens is too, because the two inches available would not be enough to allow of focusing on nearer objects. The non-convertible lens, the series IV, is an excellent lens for portrait, landscape and group photography and we are sure you would be quite satisfied with it.

UVACHROME PROCESS. — W. P. H., Des Moines, Iowa, writes — Will you please inform me where I can secure information and materials for the "Uvachrome " process, as described in AMERICAN PHOTOGRAPHY for September 1921. If there is no American agent, will you please send me the German concern's address. *Answer.* Instructions for making Uvachrome prints will be found in "Practical Color Photography" recently published by our publishers. The paper is no longer on the market.

LIGHT AFFECTED BY ALTITUDE. — L. W. M., Colorado Springs, Colo., when purchasing an Exposure Disc, asks, — Will the brightness here (on account of altitude) change the markings any? *Answer.* We do not think you will have any difficulty in allowing for the brightness of the light on account of altitude in your judgment of the different factors. There is so much latitude in the modern plate and film that, even should there be a little overexposure, it will hardly be apparent. If you find you are overexposing, change the light factor, call it "intense," for instance, instead of "bright." But we do not think the difference will be enough for that.

WASHING PRINTS IN SEAWATER. — A. N. N., Manila, asks if it will do any harm to wash gaslight prints in salt water as fresh water is sometimes hard to get on shipboard. *Answer.* Plates, films and paper can be satisfactorily washed in sea water with no deleterious after-effects. We should suggest, however, that if possible a final soaking of five minutes in fresh water be given, as otherwise a trace of salt may cause the absorption of moisture in damp weather.

OPTICAL MATTERS. — R. S. B., wants to know (1) How can I find the focal length of my camera? (2) How can I find the distance at which a subject will be in sharp focus at any given lens opening? (3) What is the so-called disc of confusion and can I work it out for my camera? *Answer.* (1) There are many methods for finding the focal length or equivalent focus of a lens, and one of the simplest and very nearly accurate is as follows: Set up a foot rule on a wall or other convenient place, and focus sharply on the ground glass or take a negative of it. Measure the size of the image in inches and divide into 12; this will be the ratio of the image to object or the amount of reduction which is called *R*. Then measure the distance between the foot rule and the ground glass in inches, and call this D. Then the equivalent focus is found by the following formula:

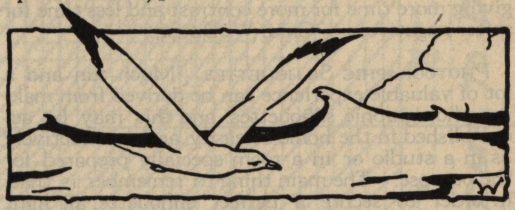
$$F = D \times \frac{R}{(R+1)^2}$$

Or in words, multiply the distance by the ratio and divide by the square of the ratio plus 1. Example: Let $D = 60$ ins. and $R = 4$, that is to say, the image of the foot rule measures 3 inches, which gives us

QUAIL IN DIXIE — H. C. BURGESS

4, as 12 divided by 3 = 4. Then we have 60 x 4 = 240, and this, divided by the square of 4 + 1 or 25, is 9 3-5 inches. There is a slight error here due to neglect of the separation of the nodal planes, but it is a small fraction of an inch and is of no practical importance. Naturally the result depends on the accuracy of the measurement of the distance and the size of the image. (2) There are also many rules for finding the nearest point in focus with a given aperture. One of the simplest is: Square the focal length in inches, multiply by 100 and divide by the stop number. Half the result is the nearest point in inches. Example: the lens is of 6 inches focus, the stop used *f*:8; then 6 x 6 = 36; 36 x 100 = 3600; 3600 ÷ 8 = 450; 450 ÷ 2 = 225 or 18¾ feet. (3). The circle of confusion is an elastic term which varies with the ideas of the worker. Practically it is the want of critical sharpness in the image of a point. This varies with the distance of the object from the eye; for instance, when examining a small print, say 5 x 4, at the distance of normal vision which is, at the distance at which such sizes are usually viewed, about 10 inches; then the image of any point must not be out of focus by more than a certain amount, which varies with different people's ideas; but 1-2000 of the viewing distance is general. On the other hand with some of the artistic school, sharpness is not permissible and then the disc of confusion may be anything. In the above case the image of the point must not be more than 1-200 of an inch. If on the other hand one was examining a 20 x 16 enlargement of the same subject at a distance of 10 feet, it is obvious that the disc of confusion might be 10 x 12 ÷ 2000 or about one seventeenth of an inch, and yet the image would appear equally as sharp as the small print. It is clear that the circle of confusion cannot be calculated for any camera, unless its dimensions are first determined. In the above answer (2) it was assumed that the disc of confusion was to be one one-hundredth of an inch; but if one sets it at any other figure then the latter must be used instead of the 100.

CUT FILM SPEEDS.—A. F. N., Nantucket Island, Mass., asks for the speed of Kodak Portrait Cut films and Kodak Super speed cut films this being used with our *Exposure Tables*. *Answer*. The speed of the Kodak Portrait Cut film is 1, that of the Super Speed cut film ½.



NATURE AND WILD LIFE

In looking over my August copy of AMERICAN PHOTOGRAPHY, I note the two pictures in "Nature and Wild Life" by Mr. H. C. Pendery, which I consider very good, in view of the fact that they are "nature fakes." I am enclosing two pictures of some Quail or Bob-white, which are *not* fakes, but are photos of real genuine live birds.

The story follows: A young man in the country came across a nest of young quail, and as the mother had been killed by a Sportsman (?) (notice the question mark) the baby quail were in a good way of dying of starvation. So the young man put them in his hat, and took them home where, in the course of time, they became as tame as young chickens. They would follow him around the house and yard, would let anybody pick them up, and handle them. He would go in the yard, and whistle, and the young quail would come running up to him, like a flock of chickens. There were eight of them, and the pictures show a few, on the barrel of a gun held by my brother. The rest of the birds, were on the ground, directly under the gun. Pictures were made with No. 3 Special Kodak, stop *f*:11, exposure 1-25 second. — H. C. BURGESS.

PRACTICAL HINTS

TRAY DEVELOPER. I have found that our old friend, the 3½ A-4 Kodak Tank powder, with some extra sulphite added to prevent excessive oxidation, makes a fine handy tray developer for films and plates. The formula is given as follows: —

Pyro	22 gr.
Sodium sulphite (dry)	44 gr.
Sodium carbonate (dry)	44 gr.

For use in the tray, dissolve the powders in 11 oz. only of water, and add from 20 to 30 grains of sulphite. This gives a developer with 2 grains of pyro to the ounce. According to Watkins, such a developer has a temperature coefficient of 1.5 and a factor of 12. I have found the following development time approximately correct: 58°, 8½ minutes; 60°, 8 minutes; 62°, 7¼ minutes; 64°, 6¾ minutes: 66°, 6¼ minutes; 68°, 6 minutes; 70°, 5½ minutes. These times are for Kodak and Vulcan film, Premo film pack, Seed 30 plates, and all films and plates requiring a dilution of developer equal to "S" on the Thermo Development Chart. However, it would be well to work out your own time and temperature table to suit the degree of contrast you desire, giving more time for more contrast and less time for softer negatives. — CARL W. BEESE.

PHOTOGRAPHIC SILHOUETTES. Much fun and a lot of valuable experience can be derived from making photographic silhouettes, and this may be accomplished in the home as easily and as effectively as in a studio or in a room specially prepared for the purpose. The main thing to remember is that, in order to secure a perfect silhouette, all light must come from beyond the person being photographed. In this way the subject will present a jet black surface to the sensitive film while the background is light. When the film is developed, the portion where the subject appears will be transparent while the background will be more or less dense and opaque.

A north light is best because it is evenly diffused. Prepare a muslin covered frame and hang it over the window. The cloth will subdue the bright light and render the effect more striking. The subject is then posed in the usual manner, a profile, of course being arranged. It is necessary to have all other light excluded. The model should be relaxed and completely at rest so that a long exposure of two or three seconds can be given. Such portraits are very effective and often quite artistic. — DALE R. VAN HORN.

A TIME AND TEMPERATURE DEVELOPMENT DIAGRAM, by Arthur S. Little. The need of a simple diagram by means of which it is possible to determine quickly the correct length of time to develop a negative at varying temperatures of developing solution has long been felt. Tap water varies considerably in temperature during the year and it is inconvenient to heat or cool a solution to a standard temperature of 65° F.

Alfred Watkins has demonstrated that exposure determines the density and development the contrast of the negative. It is useless, therefore, to attempt to compensate for errors of exposure by varying the proportions of the constituents of the developer. The logical conclusion calls for a developer of constant chemical composition and strength, the time of development only being varied to give the desired degree of contrast, on account of the different development speed of various brands of plates and varying temperatures of developer.

The temperature coefficient of the developers most generally used was found by Alfred Watkins to be 1.9; that is, a lowering in temperature of 18° F. requires 1.9 times normal times of development to give the same amount of contrast or for an increase of 18° F. above normal, 1.9 times less development. This includes such developers as pyro-soda with bromide, "Kodak" powders, metol-quinol, azol and so on.

The accompanying diagram is calculated for each degree of temperature from 40° to 80° F. which constitute the extreme limits for practical use; also for every minute from zero to sixty-five minutes, which is about as long as one would desire to develop at 65° F. The resultant development time is charted for each minute from one to forty minutes, every two minutes from forty to eighty minutes, and at five minute periods from eighty to one hundred and fifty-five minutes.

To illustrate the use of the diagram: Suppose that azol, one to one hundred dilution, develops Hammer Ortho plates to the proper contrast in thirty-two minutes at 65° F. also, that the temperature of the developer today is 72° F. Follow up the vertical line from 72° to its intersection with the horizontal line from thirty-two minutes at the left of the diagram. The curved line passing through the intersection is shown on the extreme right to be twenty-five minutes which is the correct time to develop at the given temperature.

The following table gives the comparative development speed of plates and films most generally used in the United States. The figures are indicative only, as various batches of emulsions tested by different laboratories appear to show different rates of development for the same brand of plates.

Ansco	Ansco Film	1
Cramer	Crown	1¼
	Banner X	1¼
	Instantaneous Iso	½
	Medium Iso	½
	Portrait Isonon	¾
	Hi Speed	1
Hammer	Red Label	1
	Blue Label	¾
	Ortho Extra East	¾
	Ortho Non Halation	¾
Kodak	Film	1¼
	Portrait Film	1¼
Premo	Film Pack	1¼
Seed	Graflex	1¼
	30 Gilt Edge	1
	27 Gilt Edge	1
	26 X	1
	L Ortho	½
Standard	Orthonon	½
	Polychrome	½
Ilford	Panchromatic	1

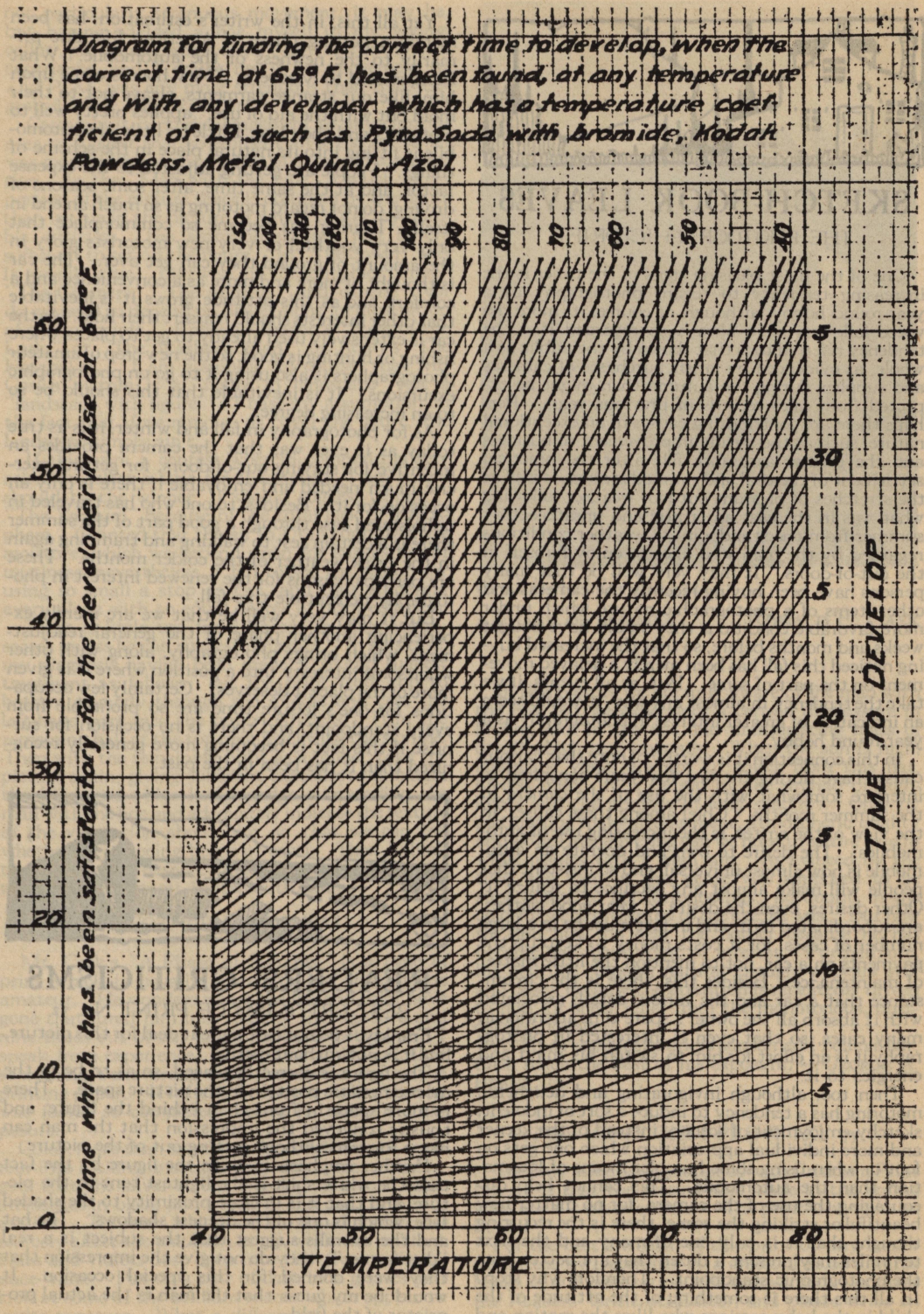


Diagram for finding the correct time to develop, when the correct time at 65° F. has been found, at any temperature and with any developer which has a temperature coefficient of 2.9 such as Pyro-Soda with Bromide, Kodak Powders, Metol-Quinol, Azol
Time which has been satisfactory for the developer in use at 65° F.
TEMPERATURE
TIME TO DEVELOP
150
140
130
120
110
100
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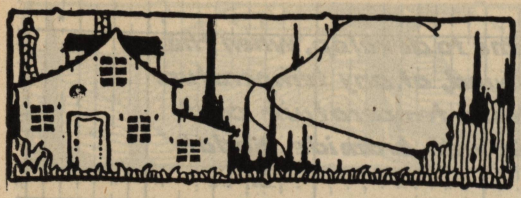


SKETCH-BOOK LEAVES

THE PHOTOGRAPHIC DRIFT

One of the most pleasing signs of the times is the increasing tendency to regard photography as a year-round hobby, although, of course, its more devoted followers have always so regarded it. The tendency referred to is that shown by the public as a whole, as evidenced by larger purchases of cameras and supplies during the autumn than might be expected from sales records of previous years. Perhaps there are contributing causes of an exceptional nature, such as the steady improvement of business and the greater assurance felt after the practical settlement of the coal and railroad strikes, as well as the stretches of pleasant outdoor weather following what was in the east an erratic and unsatisfactory summer from the standpoint of weather conditions regarded by the man who likes to enjoy himself in the out-of-doors. It may very well be that many persons have been buying recently the cameras and other items of a photographic nature which under more favorable conditions they would have bought weeks and months before, so that the increased buying noticed this fall has been merely a delayed movement on the part of some. But, at all events, if we take the tendency in almost any way, it would seem an indication of greater interest in photography as a year-round hobby.

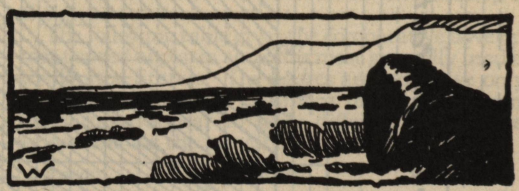
In this connection it is worthy of note that various causes have during the last few years conspired to interfere somewhat with the use of the camera in the summer months. Chief among these causes, in the view of the writer, is the increasing use of automobiles. The desire to own and operate an automobile is now almost universal, and so insistent that people will make almost any sacrifice to realize it. Other desires, even the desire to wear good clothes, are subordinated to it, and in fact must be in a large number of cases, for it costs money to keep up the payments on a car, not to mention the little matter of maintenance. Besides this, there is the circumstance that a car and the various details associated with it absorb all the owner's spare time attention in many cases, so that even if interested in photography it is an effort for him to switch his mind and energies to it.

Then too, although invigorating and delightful, motoring has a tendency to induce a sort of indolent, sketchy emjoyment of scenery instead of the keener and more individual appreciation which one gets on foot or when using some humbler means of locomotion than the automobile. This cannot help discouraging the use of the camera, for no matter how beautiful or striking the scene, there is the recurring thought that it is only one of many and the next ten miles may present a dozen that are better from the photographic standpoint. Therefore why stop? In all this there is something of the attitude of the child in the baby carriage who likes the motion and makes a fuss when it ceases.

Yet all this, in the writer's estimation, has been merely a passing phase of American life, due primarily to the newness of the automobile. What Banquo said to Macbeth, "New honors come upon him, like our strange garments, cleave not to their mold but with the aid of use," applies pretty well to motorists and their like. Little by little, the automobile is fitting into its natural place in the scheme of things. People are getting adjusted to the expense factor, and at the same time, after some seasons of driving, do not regard motoring as so much an end in itself. Touring has become so commonplace that only very youthful or very new motorists glory in the amount of ground they can get over. The car is thought of more and more as a convenience and a comfort, and as this attitude grows it is inevitable that other interests should reassert their hold. As the car is extensively used already to get to places where fishing or hunting is good, so the new crop of amateur photographers is also using it to go on photographic excursions. It is inevitable that this should be so to an increasing degree.

As for photography in fall and winter, it is as true today as it ever was that the camera provides an incentive for staying out-of-doors, for getting exercise much needed and enjoyable if there is only an occasion for it. Besides, to one who has traveled in upholstered ease through a good part of the summer there is a certain zest to walking and tramping again in the brisk weather of the colder months. These are perhaps reasons for the renewed interest in photography perceptible this fall.

But it may very well be that we are merely experiencing another phase of the general readjustment, which brings photography, along with other wholesome interests, into a position where it is given more of the place it deserves. Certainly few occupations for one's leisure time are so profitable from every standpoint, and there is no occasion for surprise if this fact is becoming more generally recognized than it has been in the past.



READERS' CRITICISMS

BEST CRITICISM OF PRINT No. 32

Frankly, I do not care a great deal for this picture, but it is not without merits.

The figure is correctly placed, so as to be in the most emphatic position in the picture space. There is more space in front than behind the figure, and thus is conveyed the impression that the man can mo e forward without getting out of the picture.

Further emphasis is given the figure by the fact that the white shirt is the lightest tone in the picture, and that it is in close proximity to the shaded face, which is one of the deepest shadows. The hat and the overalls suggest that the subject is a real "dirt farmer"; they do not give the impression that they were donned for this special occasion. It would be my guess that the man is the actual proprietor of the field.

Moreover, there is a suggestion of movement —

not particularly strenuous movement, it may be, but having wielded a hoe myself in my young, callow, pre-photographic days, I can refer to my own experience, and I doubt me if my movement at 4.30 P .M. was any more strenuous than that suggested in Mr. Cask's picture.

Certainly it is no disparagement to any camera-user to suggest that so eminent an artist as Millet was more skilful in the matter of pictorial composition. In the "Man with the Hoe" a much larger portion of the picture space is occupied by the figure than is true in the picture of which this is my humble criticism. The surroundings are just barely sufficient to set off the figure. In "The Sower" this is equally true. Likewise, in "Feeding Her Birds," "The Gleaners," "The Angelus," and others. Nor do we need to depend on Millet alone for illustration of this principle. Consider Breton's "Song of the Lark," or "The Washerwoman," or Adair's "The Haymaker." I am assuming, of course, that Mr. Cask's picture is a "figure in landscape" not a "landscape with figure." I base my assumption on the fact that if we remove, or cover the figure, the landscape simply ain't.

If this were a contest wherein competitors were asked to select a title for the picture, I am sure I should be the winner; I should suggest calling it "The Vacuum" because of the total lack of atmosphere. Granted that the air in Utah contains little moisture, which we depend upon for suggestion of mistiness, nevertheless, I fail to see the reason for using so small a stop as *f*:22, and thus rendering every plane with an equal degree of razor-edgeness.

There is little use for a doctor to diagnose diseases unless he can suggest remedies. In this case, my diagnosis having been made, I should suggest treatment as follows; cut the print from top to bottom squarely through the middle and cast the left-hand part into the outer darkness. Trim the remaining half at the top on a level with the skyline. Then with the remaining print as a model, take the picture again, giving sufficient exposure to eliminate the black-and-white hodge-podge surrounding the man with the hoe and adequately indicate the texture of the vegetation about him so that we can tell whether he is hoeing beans or cacti. Then I think the result will deserve unadulterated commendation. — BERT LEACH, Portsmouth, Ohio.

ANOTHER CRITICISM

Mr. Cask's "A Phase of Summer" is a type of print which is usually vexing to the enthusiastic amateur. He wonders where the life and color have gone that lured him into making the exposure, and nine times out of ten (until he learns better, and I speak from experience) he is prone to believe that something went wrong with the developing or the printing paper. It is hard for him to realize that he was fooled so completely before he made the exposure.

Color, more than anything else, misleads the amateur into making unsatisfactory exposures. He forgets that the silver screen is going to record color intensities in black and white — and not truthfully at that. The reds which are so visually powerful scarcely affect the emulsion at all, while the brilliant blues and violets bore deep into the silver and produce white. Put on a pair of dark blue glasses and look at some of the brilliant scenes which appear to invite exposure. What a difference!

Criticism Print No. 32

A PHASE OF SUMMER — RONALD E. CASK

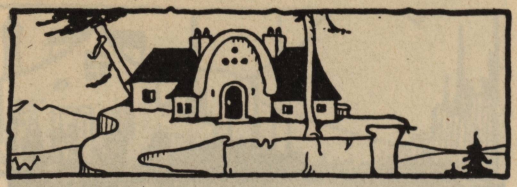
In this picture we are fully aware of the man with the hoe, but we experience a certain displeasure in finding him in the flat and uninteresting mass of detail which here abounds. When the sun is high, landscape views are apt to suffer from this flat, lifeless tone. It is caused by the myriad of highlights and the absence of long shadows. Only by picturesque mass arrangement, atmospheric quality and skilful maneuvering can we hope to secure worthwhile results with a high sun. As evinced by the title, the man in this genre was supposed to be subordinate to his surroundings; no doubt, in the colorful scene presented to the eye, he was. But now we find him too near the border because he has become the main point of interest. Furthermore, his attitude, though natural enough, appears stiff and posey because the attention is repeatedly driven to him for sheer relief from the monotonous, dust-colored foliage.

As far as technical work is concerned I believe Mr. Cask made the best of his exposure: — GEORGE A. BEANE, JR.

NEW CRITICISM PRINT NO. 35

The only information supplied with Criticism Print No. 35 is that the picture was made in the spring with a 4 x 5 plate camera. The print is a sepia on P. O. P.

For the best criticism of this print by any reader submitted by December 15, a credit of $2.00 towards books of our publication will be awarded. Address the Readers' Criticism Editor, and please write on one side of the paper only.



THE QUESTION BOX

WINNING ANSWER TO AUGUST QUESTION

How has proficiency with the camera proved of assistance to you in your profession or vocation?

FOREWORD — This question brought some very fine answers, and it was difficult to decide between the two which head the list. We believe that both Mr. Doolan and Mr. Smith will recognize this fact, although they are occupied in ways so different. The answers are just another illustration of the universal appeal of the camera and its power to enrich the individual life.

The winning answer:

John Richard Green, the English historian, when asked "What do you think the greatest boon conferred on the poorer classes in late years?" answered at once, "The six-penny photograph." This doubtless because we find them on all walls of all homes, and nothing can buy away these likenesses of "the scenes of my childhood" and of those "loved and lost a while." One picture of my sainted mother — the only one made of her in the last score years of her life — richly repays me for all the time, trouble, and expense photography ever cost me. Only lately I was appealed to almost frantically by a mother for a print of a snapshot which I made of her three-year-old — not long before the little one was snatched forever from her earthly sight. Fortunately, I had preserved the negative.

And when I look over the many excellent negatives and prints I have of family and friends and views of visits and trips, besides the increasing skill in "bringing home the bacon" for others' pleasure as well as my own, — all this affords satisfaction which isn't on the market at all. For instance, one of America's greatest railroad presidents spent his boyhood days in an old cabin home near here. When I discovered that fact, I hunted up the scene, made a good picture of it, and sent it to him with my compliments, — also with the result that I now have a letter in which he plans an early visit to the old home, and incidentally to my home too.

Although only an amateur (and "amateur" means "lover," you know) and not the least a photographer for revenue only, I am able to cash in a great deal of my work. At the recent dedication of the several million dollar U. S. Hospital for soldiers at Dawson Springs, Ky. (in this county), my 5 x 7 Seneca View camera attracted the attention of more than one firm of building contractors, and brought unsolicited orders for pictures which went a long way towards paying for the outfit. Again and again do I have calls for flashlight and other pictures of graduating classes, wedding parties, picnics, all of which offer my own price for the work.

My chief reason for first taking up photography, some five or six years ago, did however have its end in utility. In the educational work of my congregation (I am pastor of a thousand-member flock), I knew full well that eye-gate is the openest of all the entrances to the city of Mansoul. So I have always used a great many stereopticon slides of missionaries, mission-field views, illustrated hymns, educational diagrams, building plans, statistical tables, and such like. But these are always expensive to buy or even rent, not to speak of the time lost in attempting to secure them. In many, yes most, cases, such slides as I wished were not to be had in any open market at all.

For example, just after the sudden death of our best-loved mission secretary, I wished to hold a memorial service in his honor. To enhance the effectiveness of that service, especially with younger folk, I wished a good slide picture of him. Though I had a good photo of him, I could not possibly "send off" and have the slide delivered to me by the following Wednesday evening. And occurrences somewhat like this were recurring constantly. So it was make my own slides or "forever after hold my peace" so far as getting them on time, and just what I wanted, was concerned. At last I cut the Gordian knot by buying a small slide-making outfit, and now I own thousands of slides on the lines I am working in, and am adding them constantly, and all at a very low cost. Here endeth the first chapter of my photographic history.

But it ends with "to be continued in our next". If slides, why not outdoor views, and that called for an Eastman Kodak, 3A Special, and later an Ansco Vest Pocket Speedex No. 3. And why not the difficult speed pictures for which I had not a few commercial calls, therefore the Telescopic Revolving Back 4 x 5 Graflex. Then why not enlarge many of the choicest bits, and therefore an Eastman Enlarging Outfit. And why not tint and tinting-border and vignette, and — "the tale is yet to run." With a good darkroom at home, many an evening hour, after services or on "off" evenings, is spent in the most pleasant and profitable, restful and recreative diversion I have known.

Finally, since anything that is worth doing at all is worth doing right, why not subscribe for AMERICAN PHOTOGRAPHY, and some other such good magazines, just as I have done now for several years. Q. E. D. — (Rev.) LEONARD W. DOOLAN

OTHER ANSWERS

During the period of my photographic activity, which covers the last five years, I have been engaged in the operating end of the crude oil business. My work has been superintending the drilling of oil wells and looking after the financial end of the business. Hence as a rule I was spending money in pretty large sums for people not on the ground, but greatly interested in the progress of the work. I have found that a photographic record, supplementing written reports, has been of the greatest value in enabling me to make myself clearly understood. Pictures not only of the well being drilled seemed appreciated, but there was always interest in pictures of nearby development which might affect the value of the property we were operating. In some cases these pictures have materially helped in the sale of properties — at least in inducing prospective buyers to examine personally. No amount of oratory is as convincing as a photograph of a well actually producing oil.

I attribute the financial backing I have had from a prominent and very wealthy oil operator to have resulted indirectly from my interest in photography, as our friendship contered in the beginning around

New Criticism Print No. 35

this common hobby, and I doubt if we would ever have had any business relations had we not been brought together in this way, and through photography kept in touch with each other when we naturally would have drifted apart.

In my field work I have used almost exclusively an Auto Graflex Junior and then enlarged either with a Daylight Box or Illuminator (using the camera as a lantern) to about 5 x 7. I carry a sufficient outfit with me to do this work and have found little difficulty in managing the work even when there was no running water or electric lights. In such places I find a closet for a darkroom and enlarge with the box. I might send off my work to a finisher (and have sometimes done so) but as a rule want the pictures immediately and cannot wait, as I am always in some small place so it would be necessary to mail the work to a distant point, involving perhaps a week's delay for enlargements.

While I know that photography has been of some financial benefit to me — offsetting what I have spent on it many times I am sure — yet the interest it has added to life and the mental stimulus which I have had from reading both magazines and books on the subject, the study of the history of art to which I have been led by pictorial aspiration, and the pleasure that I have had in trying to learn how to make good pictures, far outweigh any financial consideration. — EDWARDS H. SMITH.

Proficiency with the camera has proved of assistance to me in my profession through its luring me into rising early while on the road that I might not lose subjects far out in the country. Thus my health has been improved, and in consequence my work as a vaudeville actor, greatly enhanced.

I continually get before booking managers, photos of our billing or some event of particular interest to men in their positions, which advertise us more effectually and far less expensively than any trade paper display.

Novel pictures of our act which would not have been obtained unless I had had my camera, have been the cause of much publicity that money couldn't buy, and have furnished us with pictures for lobby display out of the ordinary that are always desired by the resident managers, adding to our value in their eyes.

My camera has brought me in personal contact with theatrical managers of note in snapping them during their tours of inspection of circuits, which acquaintance was later broadened with beneficial business results.

My Speed Graphic has kept our light from being hidden under a bushel. Talent in show business often falls by the wayside through lack of advertising. My camera has, in a very, very great way, kept managers, booking managers, actors, and the public from saying, "I never heard of them," when our names were mentioned.

While this letter is written purely through my love of photography and my interest in its advancement, I want to point to the fact that even this letter, if published, will be an advertisement which we never would have gotten if I had no interest in cameras. — WM. A. MAHONEY.

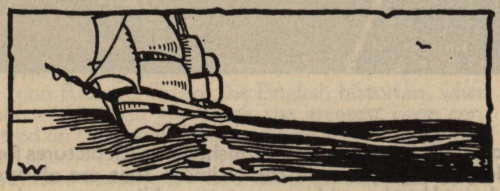
I am a high-school boy and do not know if you would consider going to school as my vocation. If you do, it may interest you to know how my camera has aided me. It is a custom in several classes in the school to publish a magazine at the end of the year, composed of class notes, jokes, and achievements. In civics I am not a shining light, but grasped opportunity by the hand when it knocked in the form of a magazine, I noted the subjects that were given out and later took my camera and made several exposures on some of the subjects. Although there were several difficult pictures among these, all the exposures were good. When I showed them to the teacher he said little, but told me to do as much of that kind of work as I could. When the magazine was completed, all the photographs in it were mine. and incidentally, almost all the illustrations. The pictures raised my mark for that month ten per cent and gave me some pocket-money as well, for the teacher ordered prints for himself and several friends. The same thing was done in several other

classes, also. Working outside of school hours my camera has helped me also. I was in a battery shop for a short while. One afternoon in dull times I took some pictures for my own interest. When I showed them to the owner he borrowed them to use in an "ad" he was going to put in the paper. As a result, other business men have requested me to take pictures of their places. These pictures brought me both friends and pocket-money. When a camera aids me this way, who can question my wasting (?) money taking pictures. — FRANK STRATTON

NOVEMBER QUESTION FOR READERS

What points are especially helpful to keep in mind in constructing and locating a daylight enlarger?

For the best answer to this question received from any reader by December 15 a credit of $2.00 towards books of our publication will be awarded. Address the Question Box Editor, and write any other communication on a separate sheet of paper.



OUR COMPETITIONS

LITERARY COMPETITION

It has been our annual custom to hold a literary competition, and as this has brought us in the past a number of practical articles, we are repeating our offer this year. For the best article on a photographic subject, whether technical or inspirational, submitted to us before November 15th, we offer a prize of $35.00. We will purchase any other articles submitted which we can use, and we have usually bought about half the articles sent in. The manuscripts must be typewritten, illustrations should be kept to the minimum and diagrams should be drawn in ink neatly enough to be reproduced.

OUR ANNUAL COMPETITION

We publish in the advertisings pages of the current issue formal notice of the conditions of our Third Annual Competition in which as usual cash prizes amounting to three hundred dollars and honorable mentions of lesser value are to be awarded. We hope that our readers will be liberal in the selection of their best prints for entry in this competition, for we expect to continue the practice of the past two years and send the prize-winning print and a substantial number of the honorable mention prints on a tour of camera clubs throughout the United States. We feel, and have had our opinion confirmed by competent critics, that the standard of the collections exhibited as a result of this competition in the last two years has been very high and that these exhibitions have given pictorialists and lovers of art in many places throughout the United States the opportunity to see a really representative collection of modern photography which, if it did not attain the standard of one of the international salons, still included enough work of salon standard and by salon exhibitors to show pictorialists what is regarded by judges and juries as high class modern photographic work.

We would like to reproduce here a few of the great number of enthusiastic letters which have been sent us by those who have seen these shows, telling what has been their effect on their community and the enthusiasm which has been aroused by them. It seems to us that the help which has been given pictorialists in the smaller towns by seeing these pictures has been sufficiently great to justify us in asking salon exhibitors to send us prints of salon quality for inclusion in the next competition and exhibition.

The 1922 prints were, or will be before December first, exhibited in the following places: New York City; State College, Pa.; Wilkes-Barre, Pa.; Worcester, Mass; Boston, Mass.; Portland, Me.; Oakland, Cal.; San Diego, Cal.; San Francisco, Cal.; and Sacramento, Cal. Thus it will be seen that photographers from coast to coast have seen these pictures and we hope to arrange a similar schedule next year. If our friends of the camera clubs who would like to see this exhibition will let us hear from them at an early date, we will endeavor to work out a schedule which will cover as many places as possible. We would suggest that two weeks be the maximum time for exhibition, as it is necessary to allow on the average a week or more between exhibitions.

SENIOR COMPETITION

The first prize in the September senior competition was awarded to Stefano Bricarelli for his interesting picture of a religious procession in an Italian village (Procession au Village.) This picture tells its own story, It is effective in grouping and lighting and in its power to convey to the beholder the sense of the earnestness with which these peasants carry out the details of their religious observances. It was made in the little town of Oulx in the Cottian Alps in Northern Italy. The Suter 9 x 12 cm camera was fitted with a Suter anastigmat of 135 cm focal length. The exposure at 11.30 A. M. in August, in bright light, was 1-50 of a second with a 2-time filter at *f*:6.8. The Tensi Ortho Antihalo plate was developed in glycin and enlarged on Gevaert Orthobrom. Page 689.

The second prize was awarded to Clark H. Rutter for "Psyche." This is a pleasing outdoor study of a child and is not only pleasing because of the charming face and beautiful figure of tne little model, but also because of the attractive placing of the figure in the space. The background is pleasantly subordinated, though possibly the light patches at the right side might be darkened a bit with advantage. Made with a 4 x 5 R. B. Tele. Graflex equipped with a 7½ inch Cooke 2a lens. The exposure, at 3 P .M. in July in Pennsylvania, was 1-10 second at *f*:3.5, with the sun shining through the trees. The Graflex roll film was developed in a tank in metol-hydrochinon and enlarged on Eastman Portrait Bromide E Rough Matt. Page 701.

The third prize was awarded to Juventino Ocampo for "Timidity." This is one of a series of deer photographs sent in and Mr. Ocampo explains their production as follows: While finishing some rolls of films for his friends, he found some snapshots of a baby feeding a deer. He discovered who the owner was and found that there were two fawns in addition to the adult deer. He visited the owner's home and found the deer living in a spacious and wooded yard together with chickens, turkeys and other animals. It was not difficult to find a suitable background and the result was a series of very interesting prints.

We liked the one reproduced the best, because of the ethereal lightness of the fawn outlined against the dark background, and the interesting pose of the animal. The light in the foreground is entirely too strong and if this were greatly subdued it would bring out the deer in more relief against the dark background of the shrubbery. The picture was taken in Pachuca, Hgo., Mexico, with a Press Graflex camera fitted with an *f*:4.5 10-inch Zeiss Tessar lens. The exposure, which was not given, was evidently very short. The Premo film pack was developed in pyro and printed on Artura Iris C. Page 693.

Honorable Mentions were awarded as follows:—

Clematis	R. L. Coffin
Cave Man	J. H. Field
Spring Landscape	C. M. Harris
Where the Daisies Bloom	J. T. Johnston
Pietro — A Guide	Earl W. Tetzloff
Quietude	James Thomson

Commendations were awarded as follows:—

Home Portrait	R. B. Archey
An October Landscape	Lawrence Baker
An Outdoor Portrait	F. E. Bronson
In the City's Vast Throng	Edwin B. Collins
Summer's Fading Glory	John N. Consdorf
A Long Island Homestead	Wm. S. Davis
The Fairy of the Dunes	Josef Froula
Morning Reflections	W. D. Goodwin
Afternoon	Herbert J. Harper
St. Peters	Margaret S. Hitchcock
In an August Garden	Harry E. Horrigan
Entrance	Jiro Ito
Standing by the Leader	J. W. Jeffers
Crossing the Brook	E. Everett Jones
Phyllis at Stone Harbor	W. Kitchen
Bobbie	Leo Kraft
Ouch!	Dr. E. L. H. McGinnis
Hawks' Nest Mountain	Geo. Miller, Jr.
Dobb's Ferry on the Hudson	Lyle A. Morse
Evening Low Ebb	Goro Niwa
Summer Sport	H. B. Rudolph
A Little Gleaner	J. H. Saunders
Madison Square	G. W. Schinkel
On the River Bank	J. A. Singler
Study Fantastic	M. L. Shattuck
Out-door Portrait	Mrs. S. S. Smith
Day Lily Bed	Edwards H. Smith
The Road to Somewhere	John C.Stick
Summer Morning Landscape	Paul M. Vanderbilt
The Top of the Hill	B. M. Whitlock

JUNIOR COMPETITION

The first prize in the September junior competition was awarded to Koji Hoshii for his study entitled "The Calm Water." Photographs of boats at wharves, with their reflections in more or less broken water, are common subjects of photography This does not differ materially in arrangement from hundreds of such prints which pass through our hands in the course of a year. Its strongest feature is the way in which the single boat in the dominant position is accentuated by the prevailing lighting. Evidently some objects to the left cast a shadow over most of the boats and the brightly illuminated white paint of this launch gives the accent which makes the picture. The reflection of the single mast is just enough to break up the foreground and this feature alone is strong enough to balance the almost monotone mass of the boats in the upper right hand corner of the picture. A subject such as this must be trimmed exactly right or it fails of its effect. This was made in Seattle, Washington, with a 3¼ x 4¼ Ensign Reflex camera fitted with a 9½ inch Wollensak Verito lens. The exposure was 1-25 second at 7 A. M. in August in bright light. The Seed Orthonon plate was developed in amidol and enlarged on Eastman Bromide No. 7. Page 695.

The second prize was awarded to J. B. Gale for "Where the Hills are High and the Trout are Large," a picture also made in the State of Washington, but, instead of being a city scene, this was taken in the mountain fastnesses of Whatcom county. It needs no criticism. The river, the rocks, the trees and the mountains form a background which is as picturesque as any can ever be and the introduction of the figure, while adding a human touch and perhaps focusing the attention on an important spot of the picture, is not entirely essential. The picture is eternal and would be there if the figure were eliminated. Made with a 2¼ x 3¼ Premo camera fitted with a 3½ inch Kodak anastigmat. The exposure in hazy light at 9 A. M. in August, was 1-25 second at *f*:7.7. The Premo film pack was developed in a tank in pyro and enlarged on Cyko No. 5, tone in a hypo alum bath. Page 691.

Honorable mentions were awarded as follows:

Photographical Study	John H. Becker
Solitude	Herbert Coates
Sonny	Theo. M. Fisher
Winter Landscape	Mrs. C. H. Johnston
Landscape	C. B. Rosher
Mother and Child	Warwick A. Sullivan
Defiance	Otho Webb

Commendations were awarded as follows:—

Old Hickory	Wm. E. Barr
Stony Point	Ralph Beebe
Outdoor Portrait	Carl W. Beese
Cloud Beauty	John H. D. Blanke
Nature's Gift and the Craft of Mankind	Ralph B. Bonwit
Summer Landscape	H. J. Brennan
Halcyon Days	John Brent
The Curiosity of Youth	E. M. Bruce
At the Market Door	Franklin Chapman
A Cozy Corner	P. N. Dean
Breaking In	Wm. Delano
Merrymeeting Bay	Herbert L. Douglas
Natural Cork-Screw Cocoanut Tree	Herb. O. Egan
Dogwood	E. A. Ellsworth
Happy Days	Jas. H. Grime
The Old Indian Trail	Geo. E. Hansen
Springtime	Wm. M. Henghan
Shady Brook	I. Higo
The Open Door	Mrs. E. C. Hildebrand
Explaining	W. Keibel
The Canal—Winter	Wm. B. Kemp
Road from Indian Hill	Jas. B. Kent
Hollenbeck Park	C. M. Kirk
The Japanese Birch	I. Komamiya
Rhododendrons	W. W. Kuntz
My Goat	Th. L. Lim
Kodak as you Hoe	Wm. Ludlum
Woodchuck	H. J. Mahlenbrock
Mollie Ann Brook	S. Mitchell
After the Rain	Taro Miyake
High Tide	Miss Lydia Mosher
The Swimming Hole	J. Herbert Neill

Nude Study	Miss L. F. Newton
The Old Fashioned Well Sweep	A. C. Norton
Morning Mist on the Sangamon	Melvin C. Parrish
Don	A. M. Ramsey
Sunset on the Delaware	J. C. Rogers
A Quiet Summer Day	Fred L. Ryan
Richard	L. B. Schneider
One Still Wintry Night	Stanley Shiner
Art Museum	W. H. Soames
Reflections	Juan C. Storer
The Dixville Notch	Roger B. Taylor
Among the Birches	A. M. Tomlinson
Hospitality	R. H Watson
Through the Pasture Gate	J. F. Webster
Home	John Wilkins
Through the Bridge	Harold Winslow

ROLL OF HONOR

FIRST PRIZE

J. H. Field 9 — George W. French 5

SECOND PRIZE

H. B. Rudolph 7 — Alexander Murray 6

Kenneth D. Smith 7 — Lyle A. Morse 5

THIRD PRIZE

J. Herbert Saunders 8 — Jared Gardner 6

W. R. Bradford 6 — Mrs. Sterling Smith 5

HONORABLE MENTION, SENIOR CLASS

W. Kitchen 12	Lawrence Baker 7
Sotaro Saba 12	Clark H. Rutter 7
Louis A. Dyar 11	Louis R. Murray 6
Herbert J. Harper 10	F. A. Northrup 6
Juventino Ocampo 10	James Thomson 6
Fred E Crum 9	Walter L. Bogert 5
Walter Rutherford 9	Stefano Bricarelli 5
Edwin B. Collins 8	Warren R. Laity 5

Elizabeth B. Wotkyns 5

COMMENDATION, SENIOR CLASS

Margaret S. Hitchcock 32	John N. Consdorf 7
Dr. E. L. C. McGinnis 18	Wm. S. Davis 7
Gus Schinkel 17	W. H. Finch 7
J. A. Singler 17	Paul E. Guillot 7
E. E. Jones 15	Gregory L. Oliver 7
F. E. Bronson 14	M. L. Shattuck 7
Arthur Palme 14	Roy H. Heiser 6
Julien J. Proskauer 14	H. E. Horrigan 6
B. M. Whitlock 14	Wm. B. Imlach 6
C. M. Harris 13	Wm. D. Goodwin 5
J. K. Hodges 12	Chas. T. Graves 5
Leo Kraft 11	C. A. Heald 5
Frank R. Nivison 11	Frank H. Luwen 5
A. C. G. Allison 10	Herbert C. McKay 5
Geo. Miller, Jr. 10	James J. Ryan 5
Jiro Ito 9	John C. Stick 5

HONORABLE MENTION, JUNIOR CLASS

J. W. Jeffers, 6	Theo. M. Fisher 5
Edwards H. Smith 6	Garnet E. Jacques 5
Robert E. DeLand 5	P. F. Squier 5

COMMENDATION, JUNIOR CLASS

John Ziemanski 28	Chester Demaree 9
W. Keibel 26	A. T. Flikke 9
F. H. Chant 23	Mrs. C. H. Johnston 9
Nat S. Smith 19	A. C. Norton 9
Wm. E. Barr 18	Stephen J. Palickar 9
H. J. Brennan 18	Ford E. Samuel 9
Howard E. Louis 18	Thomas C. Higgins 8
Harvey C. Pendery 18	I. Komamiya 8
Edw. L. Gilroy 17	Hannah G. Myrick, M. D. 8
Paul Richardson 17	E. J. Browne 7
W. W. Kuntz 16	Geo. L. Heath 7
Howard K. Rowe 15	Mrs. E. C. Hildebrand 7
L. Archambault 4	James Janson 7
H. J. Mahlenbrock 14	Dr. C. W. Pratt 7
J. F. Webster 13	A. M. Tomlinson 7
Miles J. Breuer 12	Harold B. Winslow 7
J. R. Frow 12	Ralph B. Bonwit 6
Willard H. Harting 12	Franklin Chapman 6
C. V. Hewitt 12	J. L. Clyburn 6
A. S. Workman 12	Jas. S. Loomis 6
Walter P. Bruning 11	Arthur W. Moreau 6
Herbert L. Douglas 11	C. B. Rosher 6
Simon Jochamowitz 11	R. D. Wilson 6
Wm. Ludlum 11	Arthur S. Yoshida 6
Ivan Sokoloff 11	Ralph S Hayes 5
John H. D. Blanke 10	I. Higo 5
Fred Goodin 10	Franklin G. McIntosh 5
M. W. Osterweis 10	Philip Mehler 5
Ralph Beebe 9	W. H. Pote 5

H. H. Van Kennen 5

OUR ILLUSTRATIONS

In the early pages of this issue will be found a series of portraits by Minya Dührkoop-Diez, daughter of the well known German professional photographer, Rudolph Dührkoop, who died a number of years ago. His daughter still operates the two studios in Hamburg and Berlin and her portfolios contain an enormous number of portraits of the best known men and women in German artistic, literary and social circles. Apparently no type of photographic portrait comes amiss to her. Men, women and children, alone and in groups, heads, busts and full length portraits, every photographic problem is attacked with equal zest and solved with equal skill. In studying her work the remarkable thing is that it seems to be impossible to find two pictures similarly posed. The great majority of professional photographers have a series of carefully studied poses adapted to their lighting and lenses, which number usually not more than a score. In one or the other of these positions they mentally place all sitters and the result is that a series of portraits from any given studio usually appears monotonous. It is, of course, much more difficult to evolve an original formula in every case, but the photographer who can do this will find his reputation growing by leaps and bounds, for the public admires originality, provided the originality is artistic.

"A Tapestry Design," by L. A. Goetz, carries out the suggestion of the title extremely well except for the trees on the left, which should have been omitted or greatly toned down. They form the only harsh lines in the composition, which is otherwise as soft and pleasing as the old tapestry backgrounds which its maker has taken as a model. The figure is attractively placed and the tonality of the picture is delightful. Page 697

"An Adobe in California," by Oscar Maurer, is a pleasing combination of simple and omnipresent material to form an interesting bit of pictorial photography. The lines of the stone wall, the tree and the house are very aggressive and it would have been perfectly possible to have photographed them in such a way as to make a very contrasty record. By

careful study of illumination these lines have lost their power to offend and form interesting elements of a homogeneous composition. The strong patch of light is well adapted to emphasize the strength and majesty of the tree trunk and at the same time has force enough to take the attention away from the tree trunk and prevent it from overmastering the rest of the composition. Page 699.

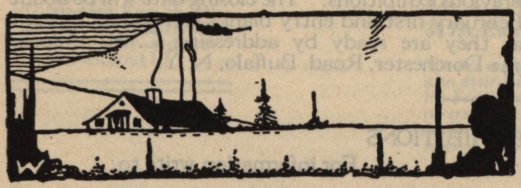
William D. Spear's print entitled "Arch, Blair Hall," is a fine piece of architectural photography. The beauty of the arch is well brought out and yet the vista through it is more important than the arch itself. The eye is carried through the picture most pleasantly to the remote distance. Page 703.

"A Spanish Lady," by Holmes I. Mettee, is a piece of genre portraiture which seems to fulfill all the requirements for such work. The costume seems correct, the face and hair in character with the costume. The pose is proud and graceful, the fan completes the picture and breaks the background effectively. The tone-areas make an excellently balanced composition. Made with a 4 x 5 Graflex camera fitted with a 9-inch Wollensak Verito lens. The exposure was 10 seconds at *f*:5 by artificial light. The Orthonon plate was developed in pyro and the print was made on Artura Carbon Black Grade E Buff, developed with amidol. Page 709.

"The Old Mill," by Karl Suchy, is a picturesque spot pleasantly rendered. Made with a 9 x 12 cm camera fitted with a 5¾ inch Zeiss Tessar lens. The exposure in Austria at 4 P. M. in June in bright light was 1-15 second at *f*:11 with a 2-times filter. The film was developed in metol-hydrochinon and the print is a bromoil Page 711.

"The Fortune Teller," by Charles H. Kragh, is an interesting indoor genre made in Shanghai, China. The placing of the figures is interesting and the spots make a pleasing pattern. Made with a 3¼ x 4¼ Adams Reflex camera fitted with a Goerz Dagor lens of 6 inches' focal length. The exposure, at 11 A. M. in March with good light, was 1-8 second at *f*:6.8. The Ilford Zenith plate was developed in pyro-soda and enlarged on Kodak Royal Cream Bromide Rough, sulphide toned. Page 713.

"Truants," by N. P. Moerdyke, well displays the fascination of the waterside for the youthful mind. These children have the true truant spirit and their interest in doing nothing when they should be elsewhere is well portrayed. Page 715.



NOTES AND NEWS

KINO-TASCHENBUCH, by Hans Schmidt. Price $1.00.

PHOTOGRAPHISCHES HILFSBUCH FUR ERNSTE ARBEIT, by Hans Schmidt. Price $1.50. Published by Union Deutsche Verlagsgesellschaft, Berlin.

The first of these little books is, as its title implies, a pocket book to cinematography, and comprises a series of brief pithy notes on the various apparatus, such as the camera, perforator, printer and projector, naturally confined solely to German types. Practical tips are also given in all other branches of the work, and one can glean many useful hint from its pages. For instance, to find the point to focus on when both near and distant objects are required to be in focus, we have the simple formula:

$$D = \frac{2 \times \text{Near} \times \text{Far}}{\text{Near} + \text{Far}}$$

In which D is the point to focus on. As an example suppose the nearest point is 3 yards away and the most distant object 8 yards, then $2 \times 3 \times 8 = 48$; and $3 + 8 = 11$. Then $48 \div 11 = 4$ yds. 13 ins.

The fact that the second work is now in its fourth edition is proof that it has found favor among its German readers. As in the previous work, the various subjects are dealt with briefly. The subjects comprise cameras for various work, optical data, development, intensification and reduction, stereoscopy and panoramic photography. Positive processes are not dealt with. The section on lenses is particularly complete and includes all the latest forms; many new forms or modifications of old forms having appeared since the war.

Both books can be recommended as brief guides in their particular departments.

* * *

ABRIDGED SCIENTIFIC PUBLICATIONS FROM THE RESEARCH LABORATORY OF THE EASTMAN KODAK COMPANY. Vol. IV. 1919-1920.

The papers which are issued at intervals by the Kodak Research Laboratory usually appear in various technical journals, some of which do not usually come under the notice of the average photographic reader, therefore, an abridgment of the same issued in one volume is extremely useful, as one can judge as to whether the original paper is worth turning up, and this is facilitated by the statement as to where the original paper appeared. The scope of the subjects in this volume is fairly wide, ranging from a new non-intermittent sensitometer to the low visibility phase of protective coloration, which obviously deals with the efficiency of camouflage. The majority of the subjects are purely photographic as one would expect, and represent the latest advances in the science. To many, of course, some of the papers will be somewhat too mathematical, and while the volume is not intended for popular consumption, it is possible that digestion with a purely practical pepsin might be an advantage. In some cases this is carried out in the form of a summary, but in others it is not. Of course, the obvious answer is that the whole volume is no more than a summary, but we venture to think that even a summary of the summaries would increase its value.

In this volume also is included an index to the volumes so far issued, which is of considerable value, and the more so in that not only are the papers indexed under the author's names, but are also classified by subject and in numerical order with the name and date of the journal in which the originals appeared.

* * *

DIE FARBENLEHRE, by Wilhelm Ostwald. Unesma Verlag, Leipzig.

This work, which is to be completed in five volumes, is an exposition of the particular color system evolved by the author. The first volume deals with the mathetic theory; the second with the physical, the fourth, written by H. Podestà, with the physiological structure of the eye and the like theories of color formation. The third and fifth, which are not yet published, are to deal with the chemical and

psychological sides of the question.

The work is by no means easy reading, for at times the style is involved and the author has a peculiar trick of coining new words, which seem unnecessary. For instance, 'mathetic' is a portmanteau word (this term is borrowed from Lewis Carroll's "Alice in Wonderland") and is intended to be a composite of logic and mathematics. Not content with the term polarisation photometer, the word "pomi" is coined, and instead of absorption, which has been in general use since the foundation of any color theory we have the term "Schluckung," which is presumably derived from "schlucken," which means to swallow. "Kress" is used for orange and is presumably derived from the word for the nasturtium flower. If saving of type is the reason for its adoption then it is hardly justified as only one letter is saved, and there seems no mathetic reason why a new term should be foisted on us. (This is a war relic, and many German writers cloud their meaning intolerably in trying to find purely German words to replace terms of Latin or other foreign derivation. — Ed.)

The particular system adopted is based on a triangle of hexagonal elements with letters and numerals to designate the particular depth of color or mixture of colors; for instance a whitish blue is *e*31*g*, in which *e*3 denominates a particular shade of blue, **1** the proportion of white and *g* the ratio of black. The colors are divided into eight, yellow, kress, red, veil (for violet), ublue (for ultramarine), ice-blue, sea-green and leaf-green. It will thus be seen that the arrangement of the colors is not in their spectral order, zero being placed in the yellow at wave-length 572. This hardly seems to offer such marked advantages over a classification based on the spectral distribution, whether one starts at the red or the violet end. We are all of us sufficiently familiar with the spectrum, to know that to unlearn its arrangement of colors and institute a new one calls for somewhat stronger grounds than put forward by the author. The new system does not bridge over the well-known gap between the reds and violets that exists in all color circles, and which for a logical system would seem to be essential. Thus the author's system gives a jump from his number 25, which represents wave-length 710 in the red, to 45, which is 420 in the violet. Exactly what the advantage is in placing the gap here instead of at the physically formed place is not clear. It is immaterial what system is adopted, because one cannot complete the circle, because the spectrum is a straight line and to complete the circle one must include those colors which do not exist in it, such as the magentas, crimsons or purples, which can be formed by an admixture of the spectral reds and violets. It would seem logical, therefore, to start with either red or violet. The fourth volume strikes one as, so far, the most valuable of the three already published, as it contains an excellent exposition of the physiological bases of color, and possibly some reason for this particular feeling is that it contains no strange or subversive theories. The older theories are dealt with throughout the volumes and there is much that is valuable, even if one does not agree with the author's particular views. —— E. J. W.

MAKING YOUR CAMERA PAY, by Frederick C. Davis. New York, Robert M. McBride & Company, 1922. Price $1.00.

In this little book Mr. Davis, whose name is familiar to all readers of AMERICAN PHOTOGRAPHY, offers a series of interesting chapters on how amateurs and professionals may find profitable markets for prints among editors of various types of magazines The information is practical, and the needs of many editors are carefully specified. The free lance will find this a very useful book.

UNDER THE ROOF OF THE JUNGLE. A Book of Animal Life in the Guiana Wilds, by Charles Livinston Bull: new edition with 59 full page plates and many minor decorations and drawings from life by the author. Boston, The Page Company, 1922. $3.00.

This very attractively illustrated book shows animals in action in many attractive and decorative arrangements. The accompanying text very interestingly describes the life of the wild animal in the tropical forests. Every lover of nature will find this book attractive and interesting.

The Sixth Los Angeles Salon will be held from November 20 to December 1 and the last day for receiving prints is November 1. Unfortunately, the announcement of this important show did not reach us in time for the publication of a notice which would enable readers to contribute. It seems unfortunate that in the case of an annual event the promoters cannot send out their notice in time to get reasonable publicity.

The Fourth Buffalo Salon will be held from March 1 to March 31 at the Albright Art Gallery. The amount of wall space is three times that allotted to previous exhibitions. The closing date will be about February first and entry blanks can be had as soon as they are ready by addressing C. R. Phipps, 142 Dorchester, Road Buffalo, N. Y.

FORTHCOMING EXHIBITIONS

Place	Date	For information write to:
American Photography Second Annual Competition	Oct. 9	
Frederick & Nelson	Nov. 6 to 18 inclusive	Frederick & Nelson, Seattle, Wash.
Camera Pictorialists of Los Angeles Closing date for entries, November 1st, 1922	Nov. 20 to Dec. 11	N. P. Moerdyke, Secretary 811 Washington Bldg., Los Angeles, California
Boston Y. M. C. U. Camera Club	Oct. 16 to Oct. 28	
Portland Society of Art	During November	
Fourth Buffalo Salon Closing date for entries, February 1st, 1923	March 1 to 31, 1923	C. R. Phipps, Secretary 142 Dorchester Road Buffalo, N. Y.
Pittsburgh Salon Closing date for entries, February 5, 1923	March 2 to 31, 1923	Chas. K. Archer 1412 Carnegie Bldg. Pittsburgh, Pa.

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Our Third Annual Competition

For the encouragement of pictorial photography the publishers of AMERICAN PHOTOGRAPHY have instituted an annual competition in addition to the various monthly competitions now held. The closing date of the third competition will be February 1, 1923. The rules of the competition are as follows:

1. Eligibility.—The competition is open to any individual photographer in the world, without entrance fee or restriction of any kind, except that employees of AMERICAN PHOTOGRAPHY or members of their families are not eligible. No contestant is required to be a subscriber to AMERICAN PHOTOGRAPHY. Joint entries are not eligible. No more than 5 prints should be submitted by one entrant.

2. Character of prints.— Prints on paper made by any photographic process except blue printing may be entered. The exposure must have been made by the contestant. Developing, printing or enlarging may have been done by another but as the pictorial character of the work will be the basis of judging, work done by commercial finishers is not likely to be of a character to receive high recognition. Hand-colored prints are not eligible.

3. Size of prints — Prints may be of any size desired by the maker, up to 11 x 14. They may be mounted or unmounted, but must not be framed. If mounted, the largest mount should be stiff enough to enable the print to stand on an easel. It is requested that no mounts larger than 14 x 17 be submitted. Prints should be carefully packed in cellular board and will be returned in the original wrappings. We accept no responsibility for damage to prints in transportation.

4. Titling. — Nothing but the title and sender's name and address may be placed upon the back. Full data should be filled out on the form below and any reasonable number of these forms will be sent on request. Prints may be regarded as ineligible if the data are not furnished.

5. Return of prints. —Prints will be returned only if request is made at the time of entry and if sufficient postage for their return is sent. They will be returned immediately after the judging, except those to which awards are made.

6. Foreign prints.— Owing to customs regulations prints from foreign countries should be sent not more than two in a package, not larger than 8 x 10 in size, and without writing. We do not undertake to pay duty on prints from abroad, but if sent as described above they will probably not be assessed duty, especially if marked "Amateur prints—no commercial value," on the outside of the wrapper.

7. Prizes: — Prizes will be awarded as follows:

First Prize.....$100.00 cash	Third Prize.....$25.00 cash
Second Prize.....$50.00 cash	Fourth Prize .....$25.00 cash
Fifth to Fourteenth Prizes .....$10.00 each	

The judges will also be authorized to award about fifty Honorable Mentions of the value of $2.50 each, payable in subscriptions to AMERICAN PHOTOGRAPHY or books of our own publication. Prints awarded prizes are to remain the property of the publishers. Any prize may be declined, if the competitor prefers to retain the print. Prints awarded Honorable Mention may be reproduced by them if desired, but will be returned if request is made.

8. Judges — The judges will be photographers, artists or critics of repute, their names to be announced later.

9. Exhibition. — The publishers of AMERICAN PHOTOGRAPHY reserve the right to retain prints deemed worthy of exhibition for a reasonable period, and will endeavor to arrange public exhibitions of the best prints before several Camera Clubs in Boston and elsewhere, as soon as possible after the closing of the contest.

10. Forwarding.— Prints must be forwarded to AMERICAN PHOTOGRAPHY, 428 Newbury Street, Boston 17, Mass., express or postage prepaid. Closing date is February 1, 1923.

Title.....**Where Made?**.....

Maker's Name.....

Address.....

Return or not?.....**Amount of postage inclosed**.....**Camera**....**Size**.....

Lens.....**Focal Length**....**in. Stop used,** *f:*.....**Filter**.....**times**

Date.....**Hour**.....**Light**.....**Exposure**.....

Brand of film or plate .....

Developer .....

Printing paper (state grade in full).....

Please give as full data as possible regarding special manipulations, as hundreds of our readers ask us how exhibition prints are made.

HIEROGLYPHIC OR GREEK METHOD OF LIFE DRAWING

By Adolphe Armand Braun

THIS valuable work, including the principles of a novel method of drawing the human figure from life or from posed photographs of models, has met a most enthusiastic reception in England, where this method was originated and the book first published. Three large editions have been taken by the English market, and we feel that it is a great privilege to be allowed to introduce it in this country.

This method has many novel features; its object is to interest, to instruct, and to inspire, and its claims are based not entirely upon its originality, but by appealing to the imagination of his readers, the author hopes to convey to their minds in a rapid and pleasant way many facts which would otherwise take them a long time to assimilate.

The book has been written with the idea that it should be used in a variety of ways, and the pictures are designed to be used for study and reference.

It contains about one hundred fine reproductions from nude photographs from the life of a female model of exceptional excellence and attraction.

The diagrams are numerous, running into hundreds, and are accompanied by notes which render them independent from the letterpress. The work has been conceived on such lines as to make it self-sufficient, and it is not in any sense an adaptation of any of the existing books.

Bones and muscles have been given new names, easy to recollect and associate with their use, shape or location. The Atlas bone, for instance, has been called the nodding bone, because by its structure and contact with the skull, it controls the movement by which we nod and shake our head. The axis bone has been renamed NO bone, because the construction of this bone enables us to turn the head from side to side. As the anatomical names are also given in connection with the new names, students may adopt or drop either as they choose.

Reasons have been given wherever needful, and the whole system has been made as simple and comprehensive as possible.

Miss Dorothy Lees, the model, has contributed an able article on the art of posing.

Mr. Champneys has designed some attractive compositions to amplify the idea of the poses.

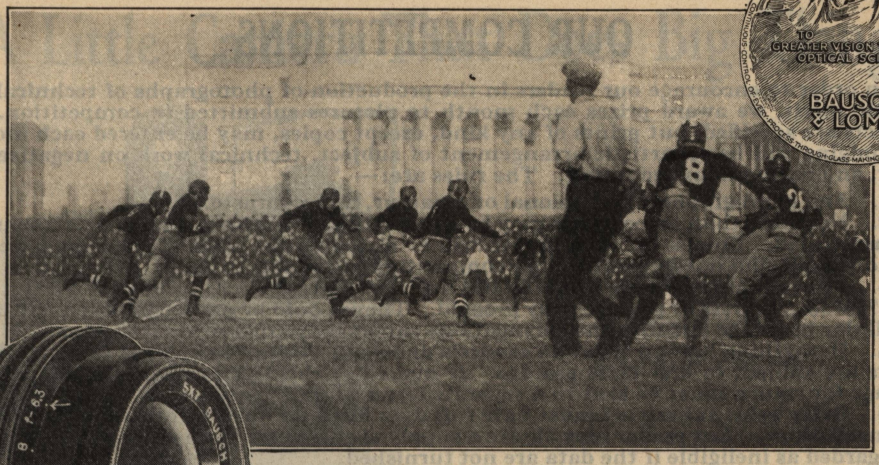
Mr. L. C. Bruno has designed the cover.

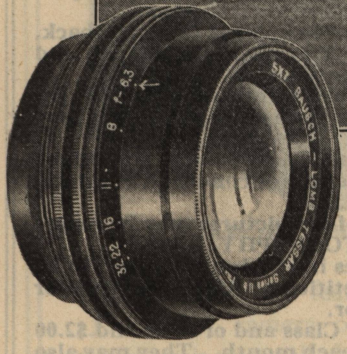
Mr. H. R. Millar has contributed many notes on figure drawing which his experience as an eminent and successful black and white artist render exceptionally valuable.

Every artist, designer, photographer, art teacher, and student of art or anatomy will find this book of very considerable interest and value.

PRICE $7.50 POSTPAID

American Photographic Publishing Co., 428 Newbury St., Boston 17, Mass.





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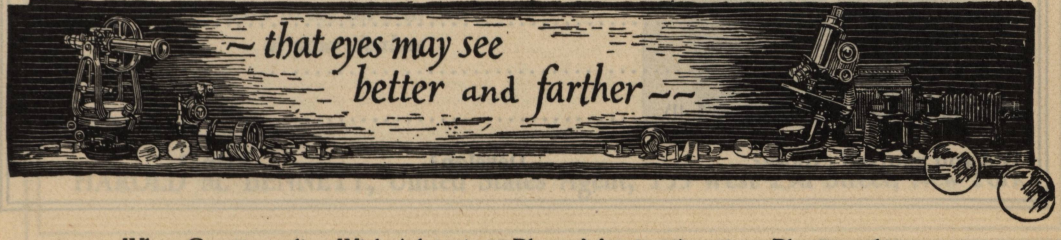

OUR COMPETITIONS

In order to encourage our readers in the production of photographs of technical and artistic merit, we award prizes each month to pictures submitted in competition. No subjects are specified, but prints of any kind, except copies, may be entered each month. The judging will be on artistic arrangement of subject, technical work on negative and print, and harmonious mounting. The rules are:—

1. Any photographer, professional or amateur, may compete.
2. Not more than three prints may be entered in any monthly competition, mounted or unmounted. Entries for each month will be closed on the 15th. Prints must be sent by individuals and not by two or more competitors in collaboration.
3. Prints should be sent to AMERICAN PHOTOGRAPHY, 428 Newbury Street, Boston 17, Mass., express or postage fully prepaid. They should be packed between two layers of cellular board, so cut that the corrugations run at right angles to each other.
4. If anything beyond title and sender's name and address are placed upon the back, prints are subject to first-class postage. If mailed at third-class rates, the coupon and postage for return must be sent in a separate letter of notification.
5. Every print submitted must have full data filled out on a form similar to that reproduced below. Any reader may obtain a supply of these blanks on request. Prints may be regarded as ineligible if the data are not furnished.
6. Prints will be returned ONLY if request is made at time of entry, and if conditions of Rule 4 are observed. We accept no responsibility for safe return or condition of prints, but will endeavor to pack safely and return in good condition.
7. Each competitor agrees by making entries that any of his pictures may be reproduced, with criticism, by the publishers of AMERICAN PHOTOGRAPHY.
8. There will be two classes: Junior and Senior. Entries in the Junior Class will be accepted from those who have not won 5 Prizes in our competitions. After a competitor has entered the Senior class he must not return to the Junior.
9. Prizes of $10.00, $5.00 and $3.00 in value in the Senior Class and of $5.00 and $2.00 in the Junior Class will be placed at the disposal of the judges each month. They may also award Honorable Mention and Commendation at their discretion. A six months' subscription to AMERICAN PHOTOGRAPHY is awarded with each Honorable Mention. The judges are authorized to withhold one or more prizes if the quality of the prints submitted is not satisfactory. Prizes will be paid in goods selected from the lists of any of our advertisers, books, or magazines. Winners are invited to notify us of their choice of prizes promptly after publication of the awards in the magazine. Prize winning prints become our property.
10. Every contestant, by entering pictures, agrees to accept all conditions and awards.

Title .....

Where was picture made? .....

Maker's Name .....

Address.....

If for competition, in which class? .....

Return or not?.....Amount of postage inclosed.....Camera.....Size .....

Lens.....Focal Length.....in. Stop used, f.....Filter.....times.....

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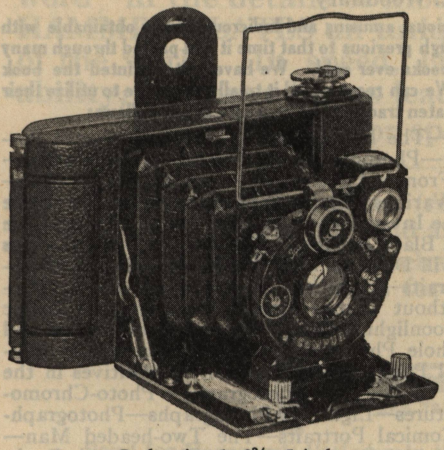

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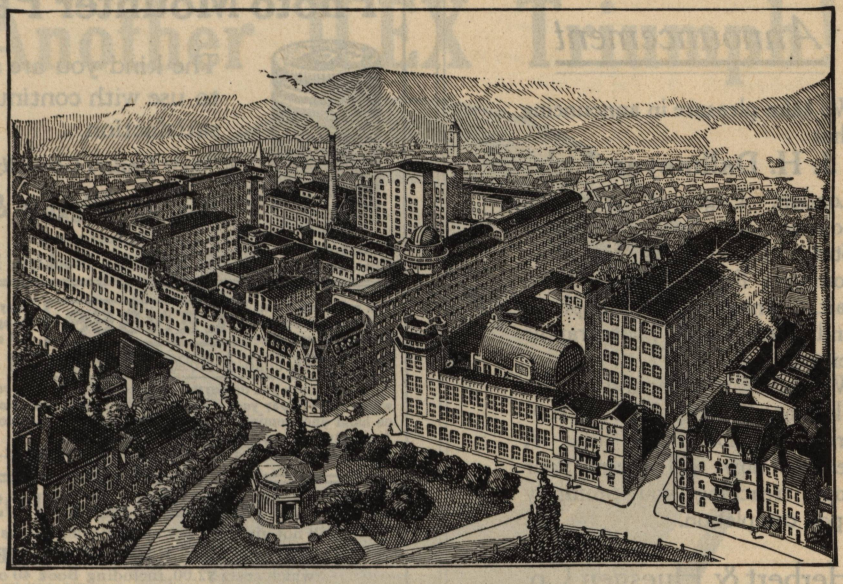

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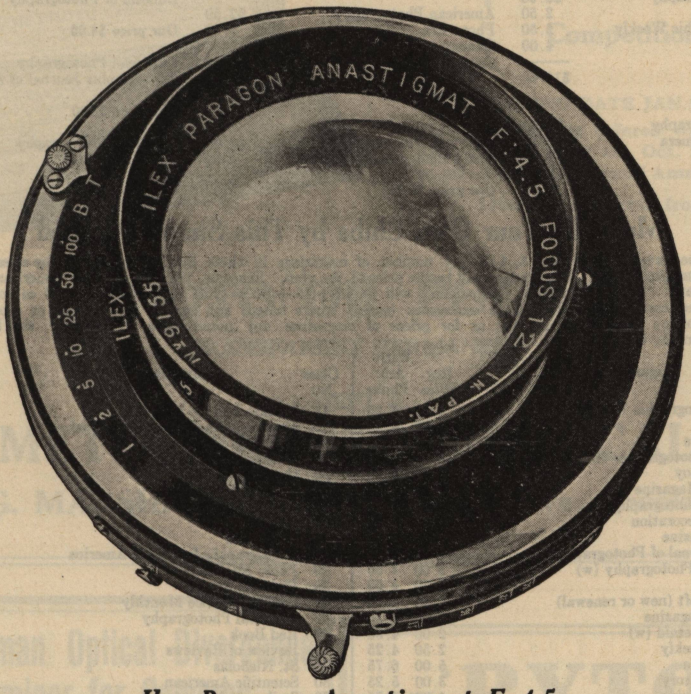

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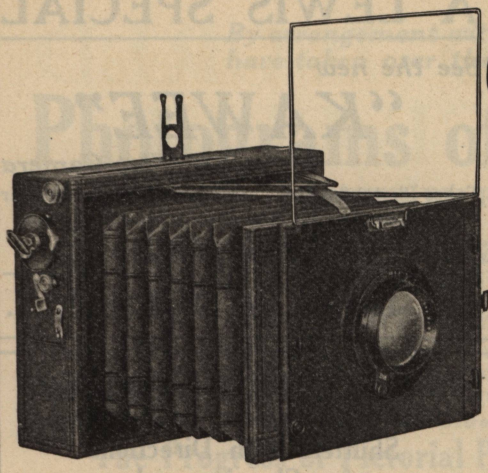

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6½ x 8½	$3.60	$4.50
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EDITED BY F. J. MORTIMER

The International Annual of Pictorial Photography

This volume will contain upwards of one hundred fine reproductions of the

BEST PICTURES OF THE YEAR

from the London Salon, the exhibition of the Royal Photographic Society, the principal American and foreign shows of 1922 and selected examples from American, British, French, Italian, Belgian, Canadian, Australasian, Scandinavian and Japanese workers.

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A complete record of the best pictorial photography of the year and a treasury of inspiration to all who follow picture making with the camera.

8½x11 inches Strong Paper Covers $2.50 Postfree Clothbound $3.50 Postfree

The book will be published in London in December, and should be ready for distribution in the United States early in January. The importation order is already practically covered by advance orders from dealers, and, by past precedent, those who do not assure themselves of a copy by placing an advance order, may find it difficult to secure one. Orders with remittance may be sent to any of the dealers mentioned below, or to the American Agents. Many other photographic dealers will have small supplies, and any photographic dealer can get a copy of the book for you. But, to be sure, order at once.

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	J. Sussman Co.		
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	Robey-French Co.		Abe Cohen's Exchange
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CANTON, O.	Roth & Hug Co.		Herbert & Huesgen Co.
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428 Newbury Street **Boston 17, Mass.**

The ROUND WORLD EXCHANGE CLUB

This organization is composed of photographers who are readers of AMERICAN PHOTOGRAPHY. The purpose of the club is to enable its members to compare their work with that of others, to collect pictures of regions and objects not personally accessible to them, and to benefit by the experience of other earnest workers. Membership carries not only privileges but also obligations. Every member is at liberty to propose an exchange to any other accompanied by one or more sample of his work, but not to send a second lot unless the exchange is accepted. The member accepting an exchange is bound to make prompt return of his own prints or those accepted.

Rules

Any photographer, amateur or professional, may become a member by signing an application blank and agreeing to abide by the rules. Upon acceptance of his or her application, a membership number will be assigned.

Any member may propose exchange of prints to any other member, giving his membership number. He shall send not more than three sample prints with a *stamped and addressed* envelope large enough for their return (if both members live in the same country). In requesting exchange with a member living in a foreign country, an addressed envelope must be sent, and sufficient money for return postage in international reply coupons. These cost six cents each, are obtainable in most Postal Union countries, and are redeemable in postage stamps at any post-office of the countries which issue them.

The member addressed must accept or refuse the proposition for exchange promptly (within ten days at the outside). If refused, sample prints must be returned. If accepted, an equivalent number of prints must be sent, and details for further exchange may be mutually adjusted by code correspondence.

Membership number must be given in every letter, and unless it is given the communication may be disregarded.

Failure to make prompt returns or satisfactory explanation may and will be punished by expulsion in the discretion of the director.

A member not satisfied with the prints sent him in exchange may return them and demand others or the return of his own.

Every member is free to refuse any or all prints offered in exchange, without giving offense. As the object of the club is mutual satisfaction, no member should feel obliged to accept prints for which he does not care.

Prints must be under cover and carefully packed. No writing may be included beyond the name, address, membership number and title. As double postage due is charged in foreign countries, this rule must be carefully observed.

Photographic post-cards may be exchanged by special agreement. A proposition to exchange may be made on such a post-card, and the member addressed is not bound to reply or return the card, if he does not wish to exchange.

Violations of the rules will be punished by expulsion at the discretion of the director.

F. R. FRAPRIE, 428 Newbury Street, Boston 17, Mass.

I hereby apply for membership in "The Round World Exchange Club" and agree to comply with the rules as set forth above, failing which I understand that I may be dropped from the list of membership.

Name..... .....Date.....

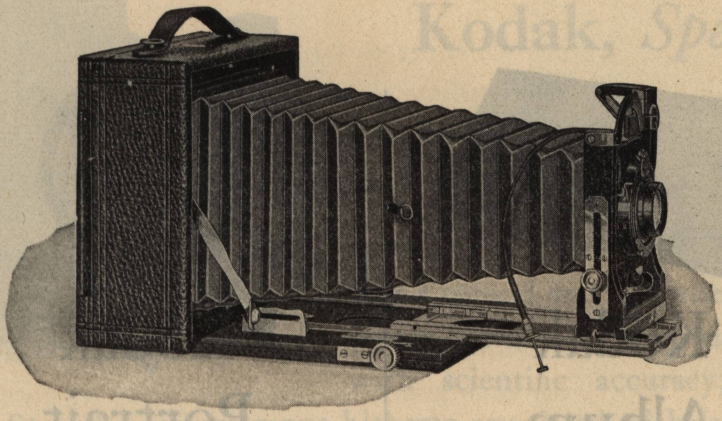
Full address .....

.....

I offer in exchange as follows: —

Size	Printing Process	Character of Subjects

For a variety of work—



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Once it's the swing bed that saves the day, again it's the reversible back, the rising and falling front, the focusing panel or the long bellows. All these advantages are available on the Premo No. 9 so that you can get excellent results from a great variety of subjects.

Made in three sizes: 3¼ x 5½, 4 x 5, 5 x 7. Prices range from $40 to $105, depending on the shutter and lens you select. Premo catalog free by mail or at your dealers'.

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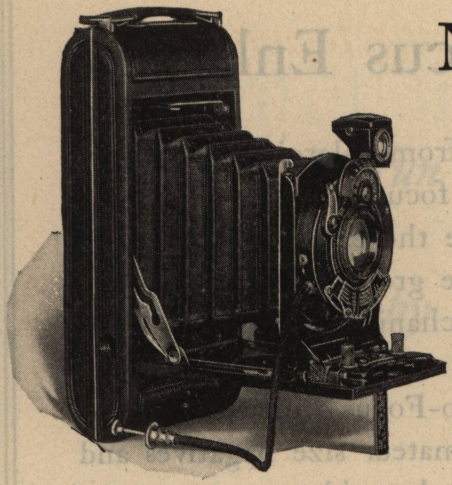
Rochester Optical Department ROCHESTER, N. Y.



No. 1 Autographic Kodak, *Special*

Pictures 2¼ x 3¼

Price $50

EXPOSURES as fast as 1/200 of a second and six other adjustable speeds down to 1/2 second, all timed with scientific accuracy, give the No. 1 *Special* a picture range hitherto associated with large cameras only. And yet you scarcely feel it in your pocket.

Since the introduction of the Kodak thirty-four years ago there has been no more signal achievement in hand camera construction.

The lens: The high-speed, high-quality Kodak Anastigmat *f*.6.3, Eastman-made from formula to finish, produces sharp, brilliant, clean-cut pictures—the kind you will be glad to keep and proud to show.

The shutter: Kodamatic shutter has seven adjustable speeds, 1/200, 1/100, 1/50, 1/25, 1/10, 1/5 and 1/2 second as well as time and bulb action, and each speed is dependably accurate.

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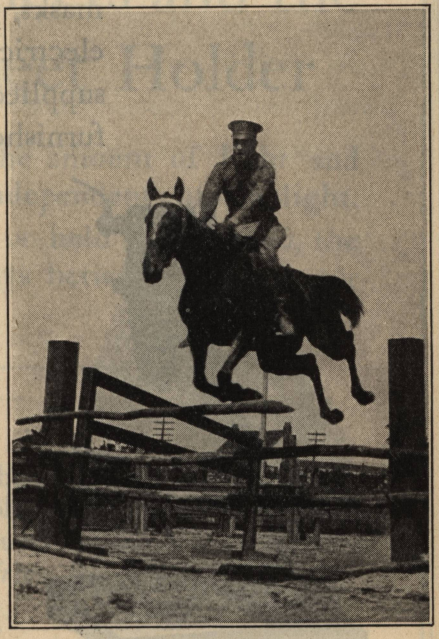


Made with No. 1 *Special*
Exposure 1/200 of a second

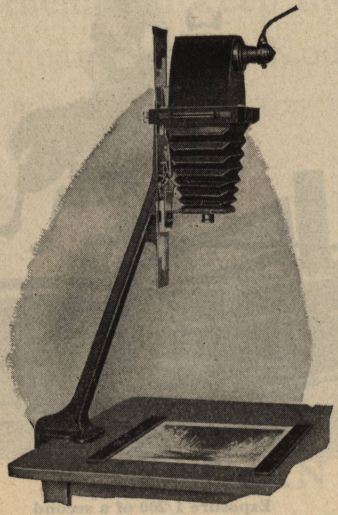
Eastman Kodak Company, Rochester, N. Y., *The Kodak City*

Kodak Auto-Focus Enlarger

Eliminates from enlarging the bother of finding the focus.

Simply slide the camera up or down and the image grows or shrinks while automatic mechanism keeps the focus sharp.

Kodak Auto-Focus Enlarger accommodates all amateur size negatives and makes prints on bromide paper up to 3½ times the dimensions of the film or plate projected. The lens is Kodak Anastigmat and the Enlarger is complete with six masks, paper holder, negative holder and electric cord with plug. Illumination is supplied by a 60 Watt Mazda lamp (not furnished).



Kodak Auto-Focus Enlarger $35.00
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Diffusing Disc 1.00
(for soft focus effects)

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ROCHESTER, N. Y.

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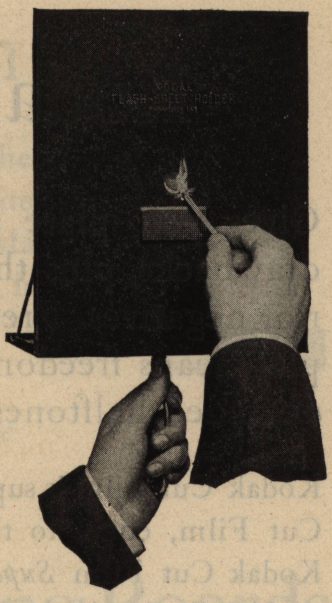

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Give you control over both the amount of light and its direction, and make you independent of daylight.

Whether mounted on a tripod or held in the hand, the metal back of the holder is always between the operator and the flash.

Eastman Flash Sheets ..... *$0.35 up*
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Ask us or your dealer for the booklet "By Flashlight." It explains in a simple, understandable style how you can make pictures at your house when daylight fails, *and it's free.*

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ROCHESTER, N. Y. *The Kodak City*

All dealers'

Kodak Cut Film

Gives you plate advantages with none of the drawbacks, plus the film features that spell superior negatives. Freedom from halation, for example, means freedom from clogged highlights and degraded halftones.

Kodak Cut Film is supplied in two speeds—regular Kodak Cut Film, equal to the best portrait plate emulsion, and Kodak Cut Film *Super Speed* which is extra fast to cope with difficult photographic conditions.

The Kodak Cut Film Sheath adapts any plate holder for use with Kodak Cut Film, and with the Combination Back both regular and *Special* models of the Nos. 3 and 3A Kodaks can be adapted for its use.

Prices

	2¼×3¼	3¼×4¼	3¼×5½	4×5	5×7
Kodak Cut Film, doz.	$0.46	$0.67	$0.93	$0.93	$1.50
Kodak Cut Film *Super Speed*, doz.	.52	.77	1.03	1.03	1.65
Kodak Cut Film Sheath	.10	.10	.15	.15	

EASTMAN KODAK COMPANY

ROCHESTER, N. Y., *The Kodak City*

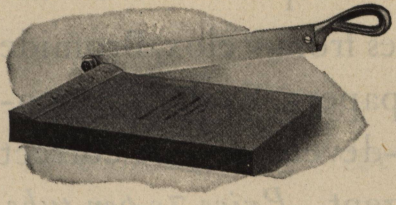
At your dealer's

Kodak Film Clip

With its ample width of two inches and its strong, toothed jaw, this clip is suited for any negative in the amateur sizes. Made of monel metal, the grip on the film is sure and will not weaken with usage.

Price, each, 30c

Kodak Trimming Boards



Kodak Trimming Boards are durably made of well-seasoned, hard wood; the knife is of good quality, tempered steel; the rule is marked plainly and permanently.

No. 1, capacity, 5 x 5 inches $0.65
No. 2, capacity, 7 x 7 inches .85

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constantly undergo rigid laboratory tests that prove them photographically right.

Eastman Special Developer—a universal developer for films and plates as well as Velox and other developing out papers. *Price 6c per glass tube.*

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